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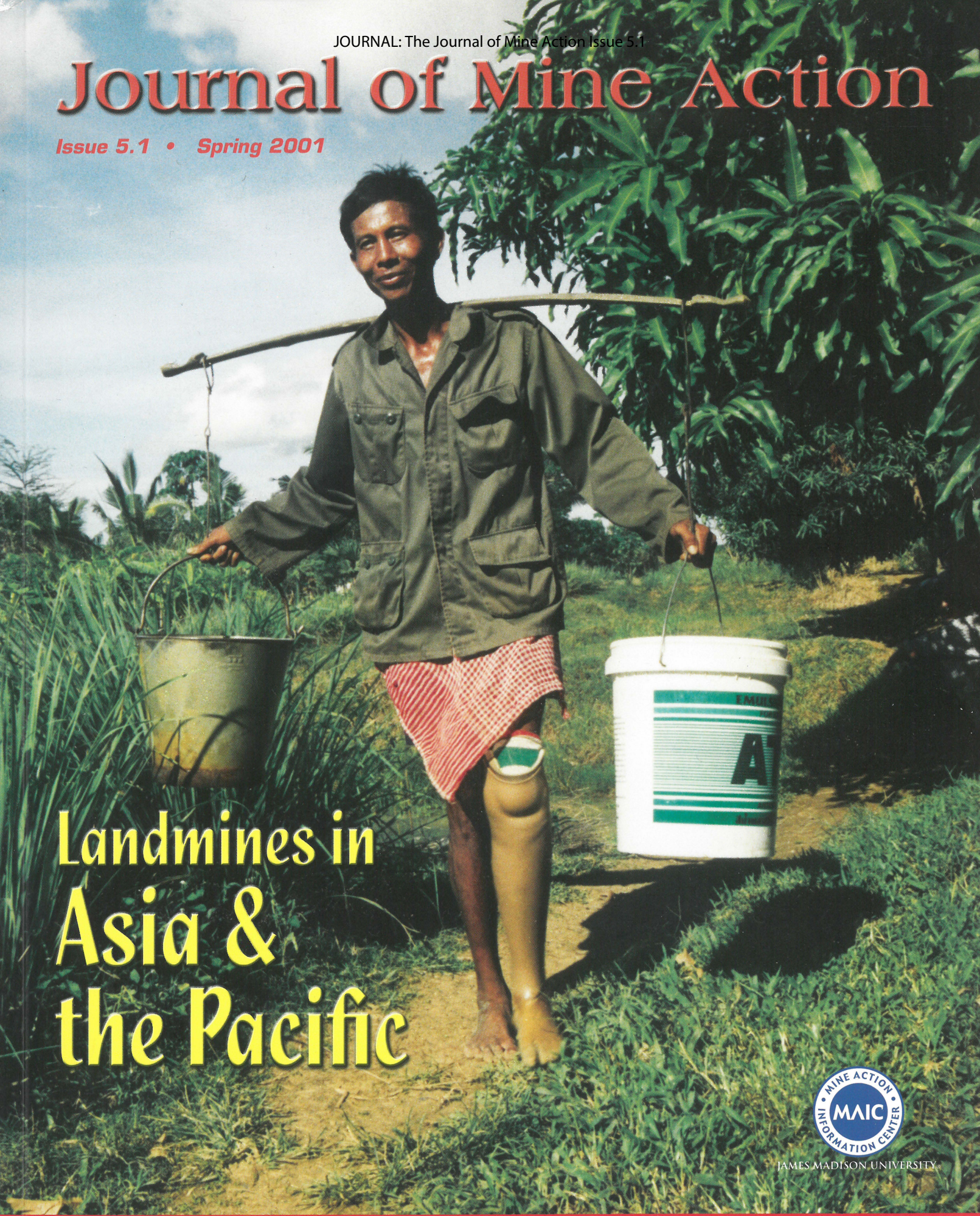


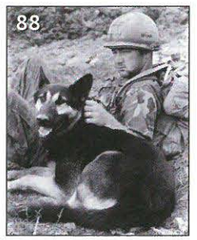
Landmines in Asia & the Pacific

MINE ACTION INFORMATION CENTER
MAIC
JAMES MADISON UNIVERSITY

Special Report Mine Detecting Dog Operations

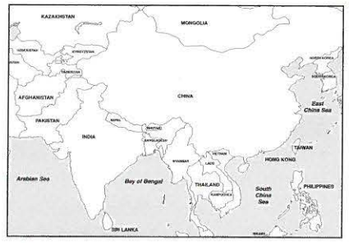
contents

Focus



Features

Correction: Sarah Warren, former project manager for Save the Children's Landmine Education Project in Kabul, was the author of *The Callenges of Mine Awareness Education for Children in Afghanistan*, issue 4.3, Fall 2000.



Notes from the Field

Profiles

Editorial

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Version 6.1	February 2002	Global Mine Action Centers
Version 6.2	June 2002	Landmines in Africa
Version 6.3	October 2002	Victim & Survivor Assistance
Version 7.1	February 2003	Manual Demining and Personal Safety
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The U.S. Pacific Command
Humanitarian Demining Program

Under the direction of the U.S. Pacific Command, SOCPAC guides the deployment of Special Operations Forces to mine-affected countries throughout Asia and the Pacific to teach clearance and develop indigenous capabilities.

By Joe Lokey, *MAIC*

The focal point for U.S. military assistance in humanitarian demining efforts in Asia and the Pacific Rim is a small, two-person office in an obscure wing of an old building on Camp H.M. Smith in Hawaii. It is from this office that two members of the Special Operations Command Pacific (SOCPAC) plan and coordinate humanitarian demining training and equipment donations to Laos, Thailand, Cambodia and Vietnam.

SOCPAC is a sub-unified command under the direction of the U.S. Pacific Command (USPACOM) and is responsible for activities covering two-thirds of the Earth's surface and 15 time zones. The training teams come from Special Forces units both within the Pacific theater and from units based on the West Coast of the United States. EOD personnel from other military units in the Pacific also augment the teams. Once they enter a country for a training mission, they are under the operational control of SOCPAC, which coordinates their activities with the host nation's U.S. embassy and their home units. They are the ideal capability to use in this important initiative because of the unique skills they develop under Special Operations Forces (SOF) training.

The Role of Special Forces

Although the humanitarian demining mission is a collateral training mission for the Special Forces teams, it directly and substantially benefits their combat skills and requirements in areas of Foreign Internal Defense (FID) and Unconventional Warfare (UW). These unique capabilities and mission tasks led Special Forces to be chosen to lead the U.S. effort to provide this kind of training and assistance to other nations. Not only do benefits accrue to those being trained, but U.S. soldiers also receive a substantial training benefit that increases their effectiveness.

In this peacetime mission, as in its wartime task, the role of Special Forces focuses on using mission related skills (FID/UW) to establish and train a host nation organization. This occurs at both the headquarters and subordinate level, in a range of basic to advanced skills such as communications, field and trauma medicine, small unit leadership, and logistics support skills. Support training is also provided in demining mission planning, as well as demining and mine awareness teaching techniques. This is all done with full cognizance of the U.S. law that prohibits U.S. forces from entering an active mine field.

In the execution of these missions, the benefits to the U.S. military of deploying Special Forces teams are clearly obvious. These deployments benefit the troops in that they provide: training opportunities to practice mission skills; experience and familiarity with the cultures in these countries; an opportunity to improve already substantial language skills; and

U.S. soldiers oversee the skills development of deminers. *c/o MAIC*

A civil affairs soldier (right) works with a Cambodian officer. *c/o MAIC*

the ability to enhance the coordination and integration of the host nation and NGOs' involvement in their activities. These unique SOF skills and the troops' considerable coalition building assets make the use of conventional forces in this role less effective.

The U.S Goal

The foundation for the U.S. humanitarian demining training effort in the Pacific, and all areas around the globe, is the focus on eventual self-sufficiency and the use of the "train-the-trainer" concept. This ensures that the host nation is fully capable of creating and sustaining their own demining teams and the support infrastructure, sooner rather than later. It is through this philosophy in the Pacific and elsewhere that the United States encourages host nation ownership and understanding of their own experiences and gained knowledge. This is truly a way to ensure that, once fully engaged, a solid foundation is provided for developing local solutions to local problems.

By integrating NGO efforts into this concept and encouraging the pursuit of donor support funding, a long-term solution to a country's landmine and UXO problem can be easily developed and initiated.

SOCPAC

The SOCPAC role in humanitarian demining, like other U.S. military involvement, operates to enhance the regional U.S. military posture in the Pacific, contribute to peace and stability in conflict prone regions, have a positive impact on critical humanitarian situations around the Pacific Rim, and foster self-sufficiency and interoperability.

The goals of SOCPAC:

- Relieve suffering from the adverse effects of landmines while promoting U.S. interests.
- Alleviate the threat of landmines to the innocent.
- Establish sustainable indigenous demining programs.
- Encourage international cooperation and participation.
- Support the Pacific Commander-in-Chief's (CINC) regional strategy for national and regional security.
- Improve the readiness and quality of training for the U.S. military involvement.

The U.S. military is specifically funded for this mission through the Overseas Humanitarian Disaster and Civic Aid (OHDACA) appropriation provided yearly by Congress. It provides the transportation, sustainment and equipment needs of the units conducting the training, and a limited initial equipment provision that is donated to the units being trained at the conclusion of training. These missions are coordinated with the U.S. Department of State, which provides more equipment and long-term capabilities to aid nations through the Nonproliferation, Antiterrorism, Demining, and Related Activities (NADR) appropriation.

It is the teamwork and coordination among the agencies working to support a nation, in close cooperation with the U.S. embassy in that nation, that makes the U.S. humanitarian

demining program so effective. Throughout the Pacific, SOCPAC is recognized as the executive agent for humanitarian demining assistance and will coordinate all U.S. assistance to the following countries that have entered into a formal agreement with the U.S. government:

Current Programs

CAMBODIA

The U.S. assistance and training program began in June 1994 with an assessment visit that set the foundation for mine clearance training and mine awareness training. This was followed by the deployment of a 27-man team in September of that year. There were three separate deployments of similar size and duration every year for the next few years until the summer of 1997 when operations were suspended because of the political situation in Cambodia. An assessment team from the U.S. Department of Defense visited Cambodia in February 2001 to review the situation and determine if U.S. assistance could be re-engaged.

As a result, the United States is planning to provide additional training and support to CMAC in the areas of medical training, munitions storage and handling, and vehicle maintenance through 2003. This follow-on training has begun with the arrival of a medical training team.

Approximately 50 to 90 people continue to be killed or injured by landmines each month in Cambodia. Current "official estimates" place the number of mines at approximately 4 million-6 million spread throughout some 3,600 mined areas identified to date. These areas are estimated to cover about 2,900 sq. km. The Cambodian Mine Action Center (CMAC), an all civilian insitution, believes that the full extent of the mine problem in Cambodia is not accurately known. Mine contamination is spread throughout the country with heavier concentrations in the northwestern provinces. UXO contamination appears to be moderate to high and comprises mostly unsophisticated munitions spread throughout the country with possibly higher concentrations in the central, southern and eastern provinces.

In spite of the heavy focus on Cambodia by the international community, it is likely that mine action operations will need to continue at the current level by CMAC for at least the next 5-10 years. Beyond that, it is likely that a reduced capability will be needed to deal with smaller or lower priority clearance tasks and numerous individual mine/UXO reports—perhaps as long 50 years.

The military engineers of the Royal Cambodian Armed Forces (RCAF) have been involved in "demining" (and bomb disposal) since approximately 1994. Their contribution to the reduction in the mine/UXO threat has been quite substantial: according to RCAF data, their troops have cleared approximately 26 million sq. m (26 sq. km) and destroyed some 88,000 mines, 46,000 booby traps and 19,000 UXO. Given the magnitude of the mine/UXO problem in Cambodia and RCAF's contributions to date, there is a strong argument to continue their involvement in mine and UXO clearance.

Though the use of national military forces for demining purposes is not unusual, their involvement in humanitarian and/or externally funded mine action activities is presently contentious or an unpopular option for some donors. As a consequence of these sensitivities, the United Nations developed the "United Nations Mine Action And The Use Of The Militaries" policy. This policy, which provides clear guidelines on this issue, was approved by the Inter-Agency Coordination Group on Mine Action on 25 January 1999. For other reasons, the U.S. assistance through both NADR funding and SOCPAC will not be through the RCAF, nor will training activities engage RCAF members. CMAC will remain the sole governmental recipient of U.S. assistance in the foreseeable future.

U.S. soldiers perform a medical skills training drill for a CMAC advisor in February 2001.
c/o SOCPAC

LAOS

The UXO and mine contamination in Laos led to a request for U.S. assistance in early 1995. An assessment team conducted a review of the Lao situation and the National Security Council's Interagency Working Group (IWG) approved U.S. assistance for a comprehensive Ordnance Removal and Community Awareness training program in October 1995. The partners in this endeavor with the U.S. teams were the Ministry of Social Welfare and U.N. Development Program (UNDP).

Training of Lao humanitarian deminers began in 1996 with a clearance and awareness mission coordinated by SOCPAC and the United States. This helped to build and establish the original training center at Nam Souang. The Lao teams assumed responsibility for their own training in October 1999 after certification and selection of trainers. Over 104,000 items of ordnance have been cleared since the creation of UXO Lao and over 700 villages visited with comprehensive mine risk education messages.

Though U.S. military technical assistance ended in 1999, UXO Lao continues to train staff at the National Training Center at Ban Ylai. Over 1,000 Lao nationals have graduated with a variety of mine action skills. UXO Lao is emerging from its consolidation phase and is moving into the sustainment phase of its growth as it seeks to reduce international support and become a fully indigenous and sustainable operation.

In April of 2000, SOCPAC conducted a technical assistance visit to the national Training Center and UXO Lao National headquarters. Possible U.S. assistance in the future will focus on training aids, explosives, and some small unit leadership training.

Though the mine/UXO problem in Laos is still large in comparison to other countries in the region, the political and security situation in the country is stable enough for existing programs to make a significant difference in the coming years. A small increase in Hmong rebel activity in the north does not appear to have a landmine aspect to it and the teams already trained are sufficient to engage any further threat.

Safety procedures and storage requirements are taught in the U.S. training program.
c/o MAIC

THAILAND

Though Thailand itself has not been engaged in a major military conflict for quite some time, the threat of smaller cross-border insurgencies and outside conflicts have resulted in a significant landmine problem for Thailand along its borders with four other neighbors. In 1998, a governmental survey indicated that approximately 796 sq. km of land can not be utilized in these border areas, within which nearly 400,000 people reside. Of these mined areas, 532 sq. km are on the Thai-Cambodian border, 124 sq. km are on the Thai-Lao border, 53 sq. km are on the Thai-Myanmar border, and 87 sq. km are on the Thai-Malaysian border.

The Lao border problem was primarily the result of the Thai Army conflict with the Thai Communist Party that started in 1964 with both using landmines as a principle weapon in a jungle war. The hostilities concluded in 1989. The problem along the Malaysian border was the result of British/Malaysian military fighting with the Communist Party of Malaysia (CPM) from the early 1950s through 1989. The military junta's repression of minority groups in Myanmar (Burma) have also led to increased hostilities and defensive actions along that border. The greatest single use of APL and threat to civilians exists along the Thai-Cambodian border. This legacy

remains from the Khmer Rouge and other internal insurgencies.

From 1994-99, a total of 2,837 landmines were cleared and destroyed by the Burapha Field Force in Sa Keao province. Enhancing existing mine detection dog (MDD) capacity at Pak Chong by acquiring, training and deploying 12 MDDs with handlers. Four MDDs with handlers are operational with Unit #1 and 10 additional dogs are undergoing training at Pak Chong Military Dog Center. The Asian Disaster Preparedness Center (ADPC), an international training center located on the campus of the Asian Institute of Technology in Bangkok, is working in partnership with TMAC to increase mine awareness in Thailand. ADPC hosted a National Seminar on Mine Action in December 1999 to announce the launch of ADPC's Landmine Awareness Program (chaired by HRH Princess Galiyani) to attendees, such as prominent members of the Royal Thai Government. As part of the Landmine Awareness Program, ADPC coordinates monthly mine awareness seminars in Sa Keao province.

U.S. assistance began in 1999 with help in establishing a mine action center in Ratchaburi and a community mine awareness program centered in Lop Buri. Several rotations of training assistance began in August 1999, while the seventh rotation of these teams arrived in January 2001. To date, there have been 300 deminers trained and a cadre of the selected students assuming instructor duties to support the live mine clearance operations which began in July 2000. It is anticipated that sustainment rotations will begin in 2002 with upgrade training and component course training in specific skills.

VIETNAM

Since the Vietnam War ended in 1975, it is estimated by the Vietnamese government and foreign experts that more than 4,000 Vietnamese have been injured and at least 500 killed in accidents involving landmines and UXO. U.S. and U.N. estimates put the number of mines in Vietnam—a battlefield from the 1940s until the 1970s—at 3.5 million.

The mine/UXO threat is varied and many of the munitions are dated and rusted—making many more sensitive and more dangerous. Vietnam itself produced as many as 18 types of AP mines in the past, mostly as copies of U.S. or Eastern Bloc mines. The only type known to have been produced in the 1990s is the "apple mine"—a recycled BLU-24 bomblet. A majority of the heavy landmine and UXO threat is in and around Quang Tri province in central Vietnam along the former Demilitarized Zone (DMZ) between north and south. Other heavily mined areas were along the Sino-Vietnam border. While China claims to have cleared all of its mines from this area, Vietnam says that it cleared more than 100,000 mines from the border between 1992-97.

In July of 2000, an assessment team briefed the U.S. Interagency Working Group on the Vietnamese request for U.S. assistance. As a result, the IWG approved the inclusion of Vietnam in the U.S. program. The initial support package is anticipated to support ongoing demining efforts by providing equipment worth about $1.7 million to help mine clearance and mine action program management efforts. The Vietnamese have a particular need for assistance with demining and ordnance clearance in shallow littoral areas, as well. The U.S. assistance program is still under formulation and will commence in the summer of 2001.

Other Regional Concerns

There are other landmine plagued countries in Asia and the Pacific Rim. At the top of most any list would be Myanmar, Sri Lanka, the Philippines, Korea, China, India, Pakistan and Taiwan. Of course, there are very specific guidelines to be met and procedures to be followed by a country desiring to receive U.S. humanitarian demining. In general, U.S. assistance is predicated on (1) the host nation submitting a formal request for assistance through its U.S. Embassy, (2) hostilities in the country having ceased and a workable peace agreement being in place, and (3) the landmine hazards being clearly present.

Not all countries that have requested U.S. assistance have been approved. Also, the demand for the highly skilled Special Forces teams in other areas around the globe is causing a shortage of qualified trainers that limits the availability of these teams. In many cases, a periodic assessment and support team visit, skills upgrade, quality assurance review and analysis, or other limited assistance may be all that can be realistic for any given request. The decision to support any country with assistance rests with the Interagency Working Group (IWG) co-chaired by the U.S. Departments of State and Defense.

Other countries in the Pacific also have significant mine problems but are either ineligible for U.S. assistance or have not asked for assistance. In **Myanmar**, 10 out of the 14 states and divisions are mined and had some 1,500 landmine victims reported in 1999 alone. In the Karen state, it is believed that one person is either injured or killed by a landmine every day. Information from within the country is unreliable and what is known comes from aid organizations working along the Myanmar-Thailand border. Myanmar also still manufactures landmines that are used regularly by the State Peace and Development Council (SPDC) to fight the various armed resistance groups battling with the military regime, including ethnic minority groups from the Shan, Karen and Karenni states in the east of Myanmar, and Chin and Arakan states in the west. The two most common are patterned after the Chinese Type 58 blast mine and Type 59 stake mine.

Another key Pacific country with a significant landmine problem is **Sri Lanka**. By the end of 1999, a small U.N. demining team in Jaffna supported by the Australian and Dutch governments had cleared about 68,500 sq. m of mined land, destroyed 577 APLs and unearthed 42 unexploded devices. Clashes with the Liberation Tigers of Tamil Eelam (LTTE) are increasing and overtaking land formerly held and controlled by government forces. Meanwhile, refugees' occupation of previously mined areas is a major humanitarian concern in a conflict that has killed 65,000 people since 1983. The LTTE has become adept at using landmines in addition to weaponry that is often far more advanced and plentiful than those used by government forces, as evidenced by the their purchase of SA14 missiles from Bulgaria and 60 tons of high explosives from the Ukraine. The consecutive losses of 11 government camps in the Wanni in November 1999 and Elephant Pass in April 2000 demonstrated that this conflict is likely to persist for some time.

A major new development in June 2000 occurred with the report of landmines in the **Philippines**. Guerilla groups from the Moro Islamic Liberation Front (MILF) and the New People's Army have been employing landmines against government and police forces, as have the bandit groups from the smaller Abu Sayyaf who kidnapped tourists in 2000. Of major concern is that many of the radical groups in the Philippines and Indonesia may be developing operational ties since a raid on a major MILF base last July resulted in Indonesian passports being discovered. The national army appears to be fully capable of meeting this threat and it is not anticipated that the U.S. government will become actively engaged in assisting the Philippines in the near future. As bilateral military exercises are conducted annually with the Philippines, this threat is recognized and dealt with to ensure proper awareness and responses are considered for the safety of all forces.

Ethnic unrest and uncertainty must continually be watched as small and poorly armed, but devoted insurgency groups seek to instill fear and respect through the use of cheap and easily manufactured weapons such as APLs and other similar improvised explosive devices (IEDs).

Police and Islamic activists with homemade bombs clashed in Brahmanbaria, **Bangladesh**, on February 6, killing six. A landmine attack in Kashmir, **India**, by the Lashkar-e-Tayyiba militants killed two soldiers on February 7. After a relatively mine-free conflict in East Timor, **Indonesia**, ended, the government there now faces a growing threat from others looking to follow as the growing build up in West Papua is being watched closely.

Finally, the Maoist insurgency has been growing in **Nepal**. In September 2000, 14 policemen were killed when the headquarters in the Dolpa district were sieged. There were no reports of APLs or IEDs being used in this instance, but the concern remains even today.

As long as landmines and UXO hamper post conflict reconstruction, pose a significant threat to civilians and cause internal shifts in refugees in Asia and the Pacific, there will be a need for training assistance and support that is ideally suited to the skills, experiences and expertise of the U.S. military units in the Pacific. When it is called upon to provide this assistance, SOCPAC will coordinate and manage its employment and program content to ensure that the highest quality training support and assistance is given. The end result will be a sustainable program and an able host nation capability. ■

A National Mine Action Institution:
The Cambodian Mine Action Center

With peace and a new government in place in Cambodia, the country has turned its attention to the debilitating mine situation. Leading these efforts is the Cambodian Mine Action Center, an all-civilian national demining program.

by Ieng Mouly, *Chairman, Governing Council, CMAC*

Background

Cambodia is a country roughly twice the size of Virginia. It shares borders with Thailand to the northwest, the Lao People's Democratic Republic to the north, Vietnam to the southeast and the Gulf of Thailand to the southwest. The country was plunged into a long period of war and political uncertainty when in March 1970 former Head of State Norodom Sihanouk was overthrown. Following a five-year struggle, in April 1975, the communist Khmer Rouge regime captured Phnom Penh, the capital city. It ordered the evacuation of all cities and towns. Over 1 million displaced people died from summary execution or forced labor. In 1978, Vietnamese troops invaded Cambodia, inciting war. The Vietnamese drove the Khmer Rouge to the Thai border and installed a new regime in January 1979 that touched off 13 years of fighting. The "Paris Peace Agreement" signed in October 1991 put an end to the conflict, though the Khmer Rouge remained an obstacle to the security, peace and stability of the country until its downfall in 1998.

Cambodia has only recently emerged from decades of conflict—conflict that displaced millions of its people and destroyed much of the country's infrastructure. The battles that ravaged most of the country have left Cambodia with a menacing legacy of modern warfare: landmines and UXO. These explosive devices, particularly AP mines, are strewn throughout the country.

Mud from heavy rains can limit transportation and wash landmines out of mine fields and into the paths of civilians. *c/o CMAC*

Landmine casualties are a fact of life in Cambodia. More than 40,000 mine victims are struggling to survive, many having paid the price of lost limbs. Many are blind. About the same number of victims have been killed by landmines. More than 2,900 square kilometers of the country are infested by landmines, which continue to kill and maim the innocent population. At present, the full extent of the mine problem is not accurately known. However, current estimates approximate the landmine contamination to number from 4 million to 6 million landmines. During periods of conflict, the military used landmines for defensive purposes and civilians used them to protect their private property. The use of landmines was generally widespread and no records were kept, making the identification of mine fields difficult.

In the early stages of the Cambodian mine action program, the information about the quantity of landmines and the location of mine fields was obtained through interviews with the local population, as well as with former soldiers. The task of determining the location and number of landmines effecting Cambodia's borders and fields was an uncertain and daunting one for mine action proponents. It was in this climate of uncertainty that the Cambodian Mine Action Center (CMAC) was created under the auspices of the U.N. Transitional Authority in Cambodia (UNTAC). In Annex 1 of the Paris Peace Agreement, one of the UNTAC mandates called for assistance in clearing mines, undertaking training programs in mine clearance and a mine awareness program to help educate the Cambodian people. The mission of CMAC was to achieve an atmosphere in Cambodia where people are free of the threat of mines and UXO, thus allowing reconstruction and development activities to take place in a safe environment. In this respect, CMAC has defined and executed four main programs: mine awareness, mine field information, mine and UXO clearance and training in mine clearance. These programs were carried out according to well-defined priorities. The highest priority concerned humanitarian purposes—the resettlement of displaced persons. The second concerned economic purposes, including the expansion of agriculture, rehabilitation, reconstruction and development projects.

The disintegration of the Khmer Rouge's political and military powers, and the subsequent formation of a new government after the general election in 1998, created a political stability that aids Cambodia's continued social and economic development. In this new era of peace, the Cambodian national mine action program is becoming part of the national development plan. The result is a national mine action program that will grow as a function of social and economic aspects that are being assessed in the National Level One Survey. This survey took place last year, with the generous support of Canada. In 2001, Cambodia will gain a clearer picture of the social and economic impact of landmines. On the other hand, the planning process and the priorities of the mine action program are worked out in close cooperation with other stakeholders in development fields. Mine action in Cambodia is no longer an isolated operation. The benefits of mine action in the realms of casualty reduction and land use, as well as in socioeconomic impacts on vulnerable factions of the general population will be more accurately measured in the future.

CMAC official marks a mine field. *c/o CMAC*

CMAC Achievement

Since its inception, CMAC has been a center of joint efforts between the Cambodian people and the international community to fight against landmines. Thanks to many generous contributions, the expertise of the donor community and the regular assistance of the Royal Government of Cambodia, CMAC has become a model of a successful national demining program. At the end of 1998, CMAC employed a workforce of nearly 3,000 well-qualified Cambodian deminers and had formed an important national landmine database—a precious demining asset for the country.

Until 1999, the mine action program worked to reduce the rate of casualties. The latest report presented by the Cambodia Mine Incidents Database Project indicated a total of 60 casualties for November 2000, compared with the monthly average of 600 casualties in 1992. This reduction in casualties is the mine action program's top accomplishment as Cambodia emerges from the turmoil of a long armed conflict.

CMAC deminers mark a portion of the lush, but mine-filled Cambodian countryside. *c/o CMAC*

Challenges and the Reform Process

The rapid growth of CMAC caused some difficulties. In 1999, the organization was plagued by constant mismanagement. This led CMAC to engage in an important reform process in order to regain the confidence of both donors and the Cambodian government. The strategy for reform consisted of: 1. Change where necessary and appropriate in order to increase the overall transparency, efficiency, effectiveness and productivity in humanitarian mine action. 2. Retention of the many positive elements of CMAC that have been developed in the past. 3. Emphasis of CMAC's core values of safety, cost effectiveness, honesty and integrity, appropriate technology, and expertise.

The result of CMAC's reform process is a mission that is unwavering in its efforts to save lives and support development for Cambodia. However,

due to serious financial difficulties, CMAC is not yet able to totally complete the reform process. In the meantime, a review mission and an socioeconomic evaluation of CMAC have been commissioned and assigned by UNDP in order to assess the structural reform and the socio-economic component of CMAC. UNDP believes that CMAC's service delivery and regulatory responsibilities must be separated. There is a general and commonly held assumption that the current CMAC mandate is too broad "to be everything to everybody"—national planning and coordination body, major provider of mine and UXO clearing services, provider of survey and mine awareness, national technical training center, and research and development institute. As a result, there is a consensus of opinion that CMAC should focus on quality of work over quantity of roles.

CMAC: Mine Action Service Provider and CMAA: Mine Action Regulator

In September 2000, the Cambodian government established a new mine action authority called the Cambodian Mine Action Authority (CMAA). The new authority will take over from CMAC the responsibilities of national planning, coordinating, and monitoring of mine action in Cambodia.

In addition, the authority will undertake the following tasks: accreditation and licensing of mine action operators (principally those involved in mine and UXO clearance); advocacy work in relation to the elimination of landmine stockpiles, usage and reporting as required by Article 7 of the Ottawa Convention; development of national standards (including survey, clearance, EOD and mine awareness); maintenance of a national mine action database and dissemination of mine action information; and status as a focal point for the implementation of the national law. CMAA is not yet fully operational as its stakeholders' roles and responsibilities in mine action are being considered.

In the current reform process, CMAC is prepared to transform itself into a national mine action service provider. The center will retain its special status as a national institution with a clear mission to implement the four core programs: mine awareness, mine field information, training in UXO and mine clearance.

A steering committee of donor representatives was first established to function as a review and advisory body for the use of trust fund resources. The committee convenes every six months to review progress reports, work plans, and consider new policy and operational recommendations. Until the end of 1998, the level of donor funding was approximately $12 million (U.S.) per year. Given the current state of Cambodia's economy, donors are requested to maintain the same level of funding for five to 10 years. It is suggested that long-term commitments will help long term planning. CMAC welcomes all support (financial, equipment and technical) from donor communities, NGOs or private agencies either through UNDP General Trust Fund, UNDP Earmarked Trust Fund, Project Management Unit (PMU), in kind donations, or by contractual arrangements.

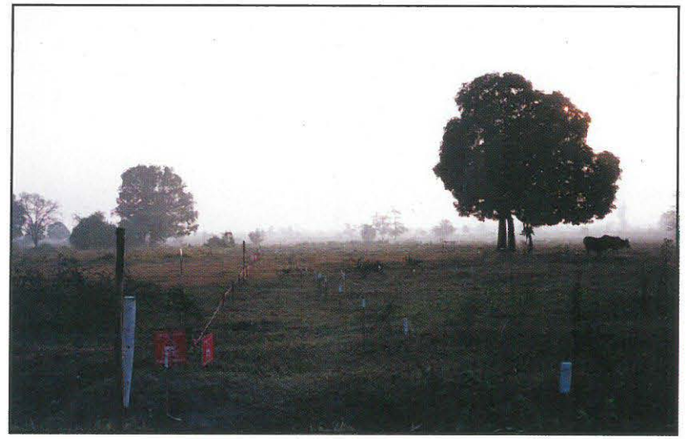
Children play perilously close to a mine field. *c/o CMAC*

Conditions Conducive to Successful Mine Action

From lessons learned in Cambodia and other mine action programs, there are two main factors that influence the establishment of a mine action program: donors and the government. Without the two, mine action cannot be carried out successfully. For more than seven years, donors have played a vital role in the development of CMAC. They are welcome to oversee the management of their contributions within CMAC.

In 1999, CMAC received $8,594,491, of which $7,989,086 came from the UNDP Trust Fund. In 2000, CMAC received only $6,298,000. The recently reconfirmed and renewed commitment of donors to maintaining capacity building and financial support to CMAC is widely considered by all deminers as a sign of optimism and hope. The overall commitment of about $5 million to the General Trust Fund for 2001 is a positive outreach. Unfortunately, it was still necessary and very painful for CMAC to reduce its staff by 1,937 people as of Nov. 13, 2000.

The Cambodian government exerts great influence on the mine action program. CMAC needs government support not only in terms of financial contributions but also for political, diplomatic and legal support. In 2000, CMAC received $700,000 from its government. At the national symposium on mine action in Phnom Penh on Sept. 16, 2000, the prime minister announced that the government's financial contribution to mine action for 2001 would be approximately $780,000. CMAC has also been aided in its mine action efforts by Their Majesties the King and Queen, the National Assembly, the Senate, the Civil Administration, the Royal Armed Forces, the National Police and the general public. However, since external donor funding will likely diminish in years to come, the government must be prepared to increase its financial contributions to CMAC. From CMAC to the Cambodian government and donors, the conditions most conducive to a successful mine action program are based on trust, understanding and transparency.



Cattle graze beside a marked mine field. *c/o CMAC*

Donor Community and Mine Action Funding in Cambodia

When UNTAC withdrew from Cambodia in 1993, the U.N. Development Program (UNDP) and the U.N. Department for Humanitarian Affairs (UNDHA) jointly launched a project entitled "Assistance to Demining in Cambodia." The project was funded by the UNDP Trust Fund, which was established for this purpose. The initial phase of the project (Phase I) consisted of two major components, both executed by the U.N. Office for Project Service (UNOPS). The first component assured the administration of an international trust fund and provided the framework through which donors could contribute military technical advisors to assist CMAC in meeting its operational objectives. The second component was financed from UNDP core funds. It provided technical assistance to CMAC to allow it to run as an efficient and autonomous national organization. The initial two-year project, running from 1994-96, was followed by a second two-year phase of support (Phase II: 1996-98) and by a third two-year phase of assistance (Phase III: 1998-2000).

Leading up to 2000, CMAC received $57.06 million from the U.N. Trust Fund. The major donors included Australia ($10.49 million), the Netherlands ($9.36 million), Sweden ($8.02 million) and Japan ($7.8 million). Other donors included: Belgium, Canada, Denmark, Finland, Holy See, Norway, New Zealand, South Korea, Switzerland, United Kingdom, and the United States. In 2001, through an UNDP earmarked trust fund, France will finance the demining of an archeological site.

Australia is the biggest contributor to the trust fund. In May 2000, former Australian Ambassador Malcolm Leader made public that CMAC has gone a long way to meet the criteria for reform as set by donors and that Australia wants CMAC to continue as an organization. He said Australia has faith in CMAC and believes it has the capacity to perform its mine clearance activities.

The current Australian Ambassador Louise Hand told a national symposium on mine action in September 2000, on behalf of the donor community, that Cambodia is a leader in the preparation of a vision that aims to move mine action in this country beyond an emergency or high capacity phase and into a longer term and ultimately sustainable development phase.

The Cambodian government has also contributed financially to CMAC through the trust fund. However, an agreement between UNDP and the government put this contribution into a "sub-trust fund" titled the "Royal Government of Cambodia's Contribution to the Governing Council and

Continued support is needed for demining efforts. *c/o CMAC*

CMAC." The rules and procedures governing this sub-trust fund are quite different from those of the UNDP Trust Fund. It is important to note that Cambodia is the only country in the world that has made a financial contribution to the U.N. Trust Fund under the custody of UNDP to support its own mine action.

Aside from the trust fund, other contributors to CMAC included the European Union (EU), Germany, UNHCR, UNICEF, CARE/UNDP, NPA and some private donors. In April 2000, a program initiated by the U.N. Association-USA was introduced to Cambodia. Since the beginning of the program, the United States has also provided in-kind donations to CMAC.

Other Mine Action Operators in Cambodia

NGOs have also combined efforts with CMAC. Halo Trust and Mines Advisory Group (MAG) are two British NGOs who were actively involved in mine clearance since the start of the mine action program. NPA provided support for resettlement, rehabilitation and community integration. Handicap International (HI) provided support to landmine victims with disabilities, the social rehabilitation in provinces, and capacity building of disabled people to the Cambodian Red Cross's database of mine victims. Other NGOs included Jesuit Service Cambodia, Marynoll and the Cambodian Red Cross. Cambodia is grateful to all governments and NGOs that have aided its mine action efforts. However, in order to attain a state of zero victims and work towards the eradication of landmines throughout the country, Cambodia needs additional external support.

Conclusion

The horrid legacy of landmines and UXO in Cambodia will be apparent for years to come as casualties continue to mar daily life. Yet, in a land hindered by years of political and social instability under the Khmer Rouge regime, the safety improvements of the late-1990s and early-21st century are symbols of significant advancement. The hope for future improvements in the realms of mine clearance, safety and program management will lie in the alliance of government agencies and NGOs, alike. CMAC and various NGOs have laid the foundation for continued success and improvement. The key now will be the integration of the CMAA into demining activities and the continued support of donors—small feats when one considers how far Cambodia has come in the past 10 years. ■

Ieng Mouly is chairman of the Governing Council of CMAC and demining advisor to the Royal Government of Cambodia. He served as minister of information and member of the National Assembly from 1993 to 1998.

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Returning Life to Field and Forest:
Mine Clearance by Villagers in Cambodia

Despite the dangers, villagers often resort to clearing mine fields, especially when the use of valuable agricultural lands is at stake. This practice is a common topic for discussion in the demining community, although it is far from being resolved.

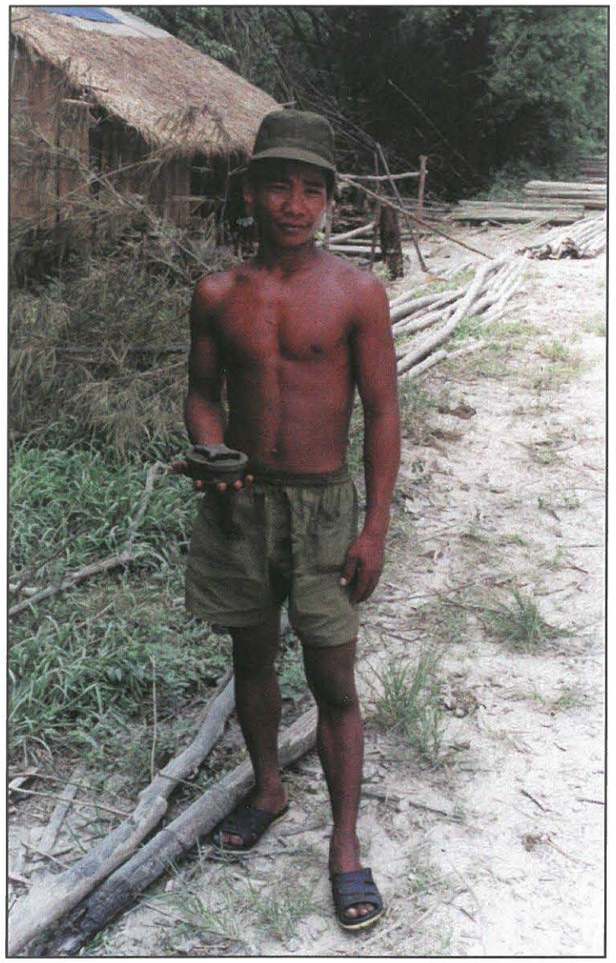
By Ruth Bottomley, *Research Coordinator, Spontaneous Demining Initiatives Study, Handicap International*

Introduction

Prak Vann lives with his wife and young son at the edge of Sung One village in Samlot district, Battambang province, a former Khmer Rouge area in the northwest of Cambodia. Their wood and bamboo house sits on an 80 by 30 m plot of land provided by authorities. Assorted vegetables and fruit grow in the fertile soil. However, before Vann and his wife could begin to grow their crops or build their house, he had to clear the land of mines. It took him three months to clear away PMD-6 and M-14 mines using simple farming tools, such as a hoe and a knife. He also cleared the mines from the land where his mother-in-law now lives across the road. Vann has never been trained in mine clearance, although he served as a soldier with the Khmer Rouge for over 10 years, during which time he was assigned to lay and clear mines. He learned on the job. His left leg is amputated below the knee from a mine injury obtained during the war.

Vann's story is not unusual in Cambodia. Almost 30 years of conflict and insecurity have left Cambodia with a legacy of landmines and UXO throughout much of the countryside. The heaviest concentration of mined land is located in the north and northwest provinces along the Thai-Cambodian border where most of the fighting occurred. The provinces of Battambang and Banteay Meanchey are considered to be the most severely affected.

Since the 1993 elections in Cambodia, mine clearance has been undertaken by U.N. organizations, the Cambodian Mine Action Center (CMAC), the military engineers of the Royal Cambodian Armed Forces and NGOs. However, these organized demining operations in Cambodia have not been able to keep pace with the need for land (Roberts & Williams, 1995:144), and relatively large sections of the population continue to live in areas affected by mines and UXO. The response of these communities has been to try to deal with the problem as best they can. One of the results of this response has been the occurrence of mine clearance activities by villagers themselves, a phenomenon that has been noted and documented to a limited extent since the early 1990s.



Village deminer holding a PMN-2 mine that he recently cleared from a path while harvesting bamboo. *c/o HI-Belgium/Ruth Bottomley*

Informing the Debate

The fact that villagers are known to be involved in mine clearance activities has led to considerable debate among mine action practitioners in Cambodia as to how this issue should be addressed. Some argue that since this type of informal demining will occur regardless of the opinion of professional deminers, it would be better to give the village deminers training and equipment in order to minimize risk. Others believe that such programs would sanction activities that would not only be a risk to the village deminers, but would also be a risk to villagers who attempt to use the unsystematically cleared land (Roberts & Williams, 1995:145).

The *1999 Landmine Monitor Report* provided astounding figures regarding mine clearance activities by villagers, drawn from the CMAC database. As of August 14, 1988, out of the total of 88,710,000 sq. m of land cleared by the different operators, local people were reported to have cleared approximately 79 percent (*Landmine Monitor Report,* 1999:402). This report was supplemented with figures from the Cambodian Mine Victim Information System, which was recording high casualty figures resulting from tampering with mines and UXO. The combined findings suggested that mine clearance by villagers, regardless of the initial debate, was continuing on a relatively large scale throughout Cambodia.

Since the early 1990s, Handicap International (HI) has been concerned about the practice of mine clearance by villagers and has been eager to learn about the issue in order to assess the viable solutions. HI stepped in to instigate a six-month research project to investigate the occurrence of mine clearance activities by villagers, or "Spontaneous Demining Initiatives." The research, which was conducted from July to December 2000, focused on the heavily mine-affected provinces in the northwest of Cambodia. The research aimed to assess the scope of mine clearance activities by villagers in Cambodia, the social and economic motivations that encourage the activity, the tools and techniques used and the quality and risk of the work. In-depth, semi-structured interviews were conducted by the research team in the provinces of Battambang, Banteay Meanchey and Krong Pailin. Out of 45 villages, 94 village deminers were interviewed. Other key informants included village authorities, families of village deminers and general villagers. Although such small-scale, in-depth research does not allow for extrapolation beyond the sites surveyed, it does give an accurate picture of the affected area and allows for common trends to be drawn out of the case studies. To provide a complement and cross-check to the qualitative data collected through the in-depth interviews, a questionnaire was also devised and sent out to 12 provinces with assistance from the Cambodian Red Cross data gatherers.

No easy or straightforward answers to the issue of mine clearance by villagers emerge from the research, and it is likely that the subject will continue to be hotly debated by those involved in the mine action sector. However, by allowing for a better understanding of mine clearance activities by villagers, the research findings may encourage a review of existing assumptions held by mine action practitioners and instigate renewed consideration of the subject.

Demining for Survival

Village mine clearance activities are generally rational activities driven by livelihood needs. The extent of village demining activities largely depends on the availability of mine-free resources, alternative income-generation activities and, increasingly, alternative mine clearance capacity.

Villager livelihoods in rural Cambodia depend on agriculture, which is supplemented by secondary activities such as fishing or the collection of forest products, including bamboo, thatch, vines and vegetables. Mines often affect the villagers' access to these very resources. In most households in the northwest it is common for at least one member to be involved to some degree in an activity in a suspected mined area simply because there are few alternative ways to make a living. The vulnerability of people living in the northwest of Cambodia is increased because of the effects of long-term insecurity in the recent past. A large proportion of the population has been transitory due to the ongoing conflict, either as refugee populations, internally displaced persons or as military populations. They have few, if any, existing resources or support systems to draw on. The high population density in these border areas and the shortage of mine-free land, exacerbated by the increasing incidence of land grabbing by powerful people, means that many of these former transient populations are now settling in areas that contain landmines.

Alternative income-generation activities may help reduce community reliance on mine-affected resources. Some villagers living close to the Thai-Cambodian border have been drawn to this area for the very reason that alternative income-generation activities are possible, and many have been able to work as itinerant laborers in Thailand. However, such work is notoriously high-risk and insecure. Many have spent time in Thai prisons, and at other times border crossings are closed, cutting people off from this additional source of income and forcing them to turn to collection and foraging activities in mined areas.

Mine clearance activities by villagers in the northwest are ultimately a strategic response to these environmental and economic conditions by a section of the population that has the ability to draw on existing knowledge and skills. The majority of village deminers are demobilized soldiers who learned the rudiments of mine clearance or mine breaching and defense tactics during their military service. However, there are also villagers who have no military background but will move mines out of their way. Demining is a necessary activity enabling villagers to support their families, often through the clearance or extension of farming land. It is also common for mines to be cleared on paths to common property resources such as forests, grazing lands and water sources, as these resources are often vital for subsistence livelihoods, particularly during lean periods when rice supplies are at their lowest. According to the findings of the research, village deminers generally clear mines for personal livelihood needs rather than as a means for alternative income. Relatively few village deminers were employed to clear mines from the land of other people, and fewer still were involved in the sale of mine or UXO parts for scrap metal or other uses.

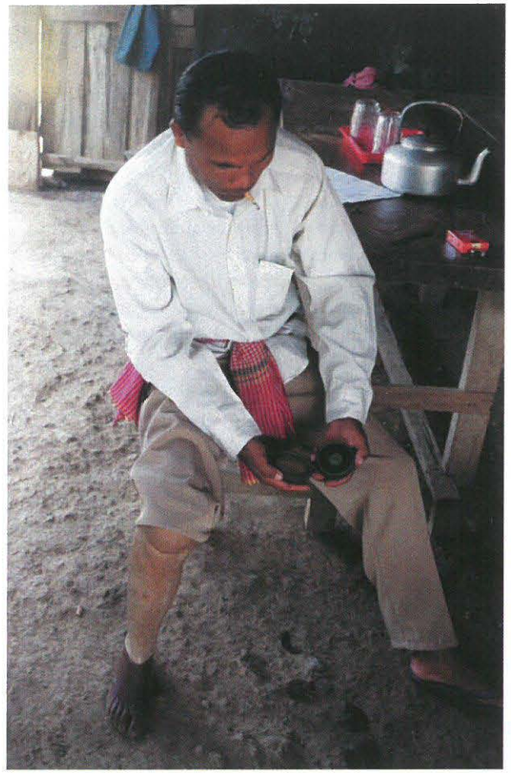
Priorities and Choice

Villagers often claim that they have to clear mines because they cannot wait for the mine clearance organizations to clear their land for them. The resources and capacity of organized mine clearance activities in Cambodia means that it is, and will remain, impossible for mine clearance professionals to respond to all the needs of rural villagers living in mined areas. Villagers may have to resort to clearing mines because they need to access land and resources in order to support their families. Limited alternative livelihood options present a decision over which they feel they have little choice. As the wife of a village deminer in Battambang province explained, "Today my family earns a living by doing farming. As far as risk is concerned, I think it is very dangerous for a man to work as a village deminer. But if my husband does not clear mines, my family will have no rice fields and we will have no way to make money to support the family." In terms of access to resources, families who have a household member capable of carrying out demining activities are perhaps at an advantage to those families who do not have this ability

Village demining may still exist even where mine clearance is operating because the prioritization of the organized mine clearance does not match the priorities or expectations of the villagers. Clearance organization priorities include land for settlement and agriculture, but such is the extent of the demand that it cannot be realistically met. Often the village land that is cleared by mine clearance organizations is neutral community land such as roads, school fields, watarams (land for the village temple) or land around pump wells. Although these areas are perceived useful as a whole to villagers, they do not respond to their individual livelihood requirements. Village deminers are able to clear agricultural land for their own individual needs and often help remove mines for others who want to access land for farming. Village deminers also clear land to access secondary resources or marginal lands, such as forests, bamboo groves or grazing lands, that are often vital to village subsistence livelihoods. Such areas are notoriously difficult to access by demining teams and are considered a lower priority in terms of cost effectiveness.

Similarly, mine awareness education often fails to address the underlying livelihood needs that drive people to clear mines by themselves. As Eaton, et al (1997:14) argue, if it is the very means of survival that are affected by mines "it is not tenable to assume that affected communities can be cautioned of the dangers and asked to await the arrival of mine clearance teams some subsequent years hence." Although mine awareness education can help promote safer behavior, it can never prevent villagers from entering suspect areas or from conducting high-risk demining activities if mines continue to be an impediment to their daily living. As a village deminer in Banteay Meanchey explained, "I participated in mine awareness education conducted by the organization. This has made me scared of digging the land and hitting mines accidentally. I also don't know where the mines are deep in the ground. However, I have no choice but to demine the land."

A field "demined" and cultivated by a villager before official mine clearance, Banteay Meanchey province.
c/o HI-Belgium/Ruth Bottomley



Village deminer demonstrating how he dismantles and neutralizes a Type 72A mine, Battambang province.
c/o Hi-Belgium/ Ruth Bottomley

The Safety Question

Humanitarian mine clearance organizations operating in Cambodia admit that they are unable to respond to the needs of all the people living in mine-contaminated areas. Villagers and local authorities often commented that they felt village deminers help make the village a safer place because they removed mines from their own land, public paths and tracks and assist other villagers, thus reducing the risk of accidents.

However, in terms of Western standards of humanitarian mine clearance, village mine clearance is a hazardous, high-risk and inadequate practice. Village mine clearance practices differ from professional demining practices in several pronounced ways. The most obvious difference is in terms of experience and training. Although the villagers may have years of military experience and knowledge regarding local mine deployment, most village deminers lack professional mine clearance training. This is reflected in their clearance methods, which, without doubt, place the village deminer in situations of much higher risk than their professional counterparts would ever experience.

Unlike professional deminers, villagers generally clear the land where they suspect mines are present. Their mine location knowledge is based on visible mines, military experience or simply from observing accidents. In contrast to professional humanitarian mine clearance, which measures activity in terms of area cleared with as close to 100 percent safety as possible, the work of the village deminer is guided by a targeted approach with a higher mines-to-area ratio. Because access to resources takes priority over complete safety of land, relatively large areas of land will go unchecked by village deminers.

Professional deminers do not touch the mines if at all possible and prefer in-situ destruction. Village deminers tend to remove the mines from the ground using their hands. Their most common method of mine disposal involves burning the mine with firewood, although a large number of village deminers interviewed during the research said that they first neutralize the mines by dismantling them. They said that this helped make the mines easier to handle and reduced the impact of the explosion when the mines were burned.

However, it should also be recognized that, despite conducting a high-risk activity, the majority of village deminers do attempt to practice a certain degree of self-regulation to reduce the likelihood of injury both to themselves and to others. Village deminers frequently said that they would not clear mines if they were drunk or felt ill, and that they only clear devices they recognize and know they can dismantle and burn. If they are unable to remove or dismantle the mines, either because they are unfamiliar devices or the parts are rusty and unstable, they tend to burn them in-situ. Village deminers usually clear alone to prevent the risk of injury to other people and to avoid distractions, and cleared mines are frequently burned in the evening when other villagers have returned home. Such practices are still far from the international safety standards recognized for mine clearance and the risk undertaken by the village deminers remains high.

Most village deminers are under no delusion that the land they clear is 100 percent safe. Both they and other villagers realize that using the eye or a hoe to detect mines leaves mines in the ground. This realization is perhaps an important one in terms of accident reduction. People are still wary on land that has been demined by villagers, but the only way to test the safety of their land is to use it. After clearance, in general, villagers will initially cultivate their fields with spades, as it allows for more careful work. If no mines are found in consequent years, they will begin to use cattle or even a tractor to cultivate their land.

An awareness of mine clearance risks is also reflected by some village deminers who have attempted to adopt safer behavior in recent years. Several village deminers said that once they had cleared mines they would keep them for professional deminers to destroy rather than dismantling and burning them. Although village deminers realize they put themselves at risk, they feel they are more likely to be injured by unknowingly stepping on a mine than by demining. The paradox of this is that in order to clear mines, the village deminer has to enter suspected mined areas, thus increasing their likelihood of stepping on a mine.

Mine clearance is a coping strategy, but due to the high risk involved, most village deminers would prefer to stop clearing mines and have mine clearance organizations clear the land for them. A village deminer in Banteay Meanchey province said, "I think that in the future I will get injured or killed and so now I stop demining and leave this work for the organization. If I continue to clear mines using only a hoe, I cannot escape from injury. Anyway, now I have enough land to provide for my family."

"Village deminers frequently said that they would not clear mines if they were drunk or felt ill, and that they only clear devices they recognize and know they can dismantle and burn."

Conclusion

As stated earlier, there is no template answer to the question of villager demining activities. Mine action practitioners will continue to dispute the pros and cons of self-demining activities by villagers, but so long as villagers need to access resources and land and they have the basic knowledge and courage to carry out the activity, village demining will continue. The reality faced by villagers living with mines every day perhaps needs to counter the moral arguments of mine action in regards to the safety of the practice. The real issue is not one of village deminers versus professional deminers, but one of the need to free mine-contaminated land and resources for local community use.

Perhaps it is time for the mine action community to reassess the situation and learn from the village deminers' experiences, reasons for demining and needs. The actions of village deminers need to be seen as indicative of the wider coping strategies of communities. Village mine clearance appears to highlight several inadequacies of professional demining in response to local-level priorities and need. The question is, *how can these needs be met more effectively and promptly?* More effective collaboration with ongoing community development initiatives could alleviate some of the economic and livelihood pressures forcing villagers into high-risk activities. At the same time, should it not be considered that the risks that are inevitably taken by these village deminers could be lessened through the promotion of safer practice? If the capacity of professional mine clearance is really such that the needs of those living in mined areas cannot be met, it is inevitable that village mine clearance will continue. ■

**The information presented in this paper draws on the findings of the Handicap International Research Study on Spontaneous Demining Initiatives. However, the opinions expressed in the text are the sole responsibility of the author.*

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Mine/UXO Casualties
and Casualty Surveillance in Cambodia

Handicap International's Reuben McCarthy details the combined efforts of HI, the Cambodian Red Cross and UNICEF in Cambodia. Putting faces with statistics, he gives the how, when and where of mine/UXO incidents in the country.

Landmine victims in Aulong Veng, Cambodia. *c/o AP*

by Reuben McCarthy,
Project Advisor, Handicap International, Belgium

Introduction

Over the last five years Handicap International (HI) and the Cambodian Red Cross (CRC), with the technical support of UNICEF, have been involved in the collection, storage and dissemination of information related to the human casualties of mines and UXO in Cambodia. The following paper provides the background to the activity, its rationale and history, along with an overview of mine/UXO casualties in Cambodia from 1998 to 1999.[1]

Mine/UXO Casualty Surveillance in Cambodia

In countries heavily contaminated with mines and UXO, mine casualty data[2] is seen as an essential element for fundraising and the effective targeting and prioritization of often limited resources, particularly in the areas of mine awareness, mine clearance and victim assistance. Depending on the scope of the information collected, mine casualty data may also provide a useful baseline for monitoring the aims and effectiveness of different components of such projects, establish mechanisms for the direct advocacy of mine affected communities, while providing valued support to national and international efforts to achieve a global ban on the sale, use and stockpiling of landmines.

Mine casualty data gathering was initiated in Cambodia by the Mines Advisory Group (MAG) in 1994. In early 1995, the Cambodian Mine Action Centre (CMAC) began a pilot project for casualty data gathering. Following the pilot project, the activity was outsourced by CMAC to CRC and HI. The two agencies were considered appropriate for the task in view of their work with the survivors of mine accidents, because of the national coverage of the CRC and its extensive network of volunteer health workers, and due to HI's ongoing role in mine action in Cambodia and experience in the development of indigenous organizations.

Starting in September 1995, HI and the CRC took full responsibility for the project on behalf of CMAC, in four provinces of Cambodia. The partnership involved CRC undertaking data gathering in provincial locations and HI providing training and technical support in the establishment of the data gathering system, database and the tools for data analysis and dissemination. Initially, the HI/CRC project was conducted in coordination with MAG's project, enabling coverage of a total of 11 of the most mine-affected provinces in Cambodia. In its formative stages, casualty data gathering in Cambodia comprised both a community and hospital level survey of accidents taking place during and prior to 1997, and ongoing surveillance of current incidents.

From 1995 to 1997, data gathering conducted by HI/CRC focused on a village level survey to provide comprehensive baseline data on the number and circumstances surrounding mine accidents in Cambodia, from 1979 to 1997. During this period more than 35,000 casualty reports were completed by HI/CRC in heavily mine-affected provinces.[3] At the same time, MAG established a mine incident surveillance system, which concentrated on monitoring ongoing mine incidents. The intention was to provide up-to-date data on incidents and casualties and to facilitate the prioritization, planning and evaluation of mine related activities.

It was perhaps a unique feature of casualty data gathering in Cambodia that it combined survey with surveillance. The combined data sets enabled a comprehensive picture of the circumstances of mine incidents and occurrences of fatal and non-fatal injuries caused by mines and UXO throughout Cambodia. The documented history allowed patterns to be traced in the rate and type of mine injuries and established means for advocating the interests of an enormous number of mine accident survivors. At the same time, the surveillance of ongoing incidents enabled the effective prioritization of mine action resources and established a baseline for measuring the effectiveness of different aspects of mine action programs, on a month-by-month basis. Nonetheless, the dual system had certain weaknesses, not the least being the lack of standardization between the information collected and the techniques for prioritizing data gathering. By the end of 1997, however, most villages in heavily mine-affected areas had been visited by HI/CRC and a national data set of historical mine incidents was mostly finalized.

Subsequently, in 1998, HI/CRC and MAG agreed on a common system of data gathering, which focused on the surveillance of current or ongoing mine incidents and their human casualties. Both data sets were later merged into a single database, established and managed by HI/CRC, and a standardized data gathering form was used by both agencies. Priority areas for data gathering were, and remain largely, determined by the degree of mine contamination at a commune, district and provincial level, as reported by MAG, CMAC and the HALO Trust. Additionally, the results of HI/CRC's national survey of mine victims have enabled the division of Cambodia into operationally high and low incident villages, districts, communes and provinces, according to the number of casualties recorded by the survey. Finally, an analysis of the history of the conflict in Cambodia, and areas known to have experienced large amounts of armed conflict, influenced the choice of sites.

Following the recommendations of a *Mid-Term Review* of MAG and HI/CRC's projects by UNICEF[4] in early 1999, MAG began to transfer the responsibility of its project to HI/CRC to enable greater standardization and use of the CRC volunteer network in data gathering. By November 1999, the transfer was complete, and HI/CRC was conducting data gathering in all of MAG's coverage areas, in addition to nine other provinces and municipalities, bringing the total coverage, by December 2000, to 20 provinces and municipalities.

In all of its aspects and phases of operation and development, mine casualty data gathering in Cambodia has as its central motivation the facilitation of a reduction and, ultimately, cessation of mine and UXO related casualties, through the collection and dissemination of timely and useful data on mine casualties to mine action agencies. Moreover, a key motivation of the project has been to provide support to survivors of mine and UXO accidents by disseminating information on the location and condition of survivors to victim assistance agencies. Thus far, the project has established an effective organization dedicated to the advocacy of the interests of mine victims and mine affected communities. To these ends, information provided by the project has facilitated:

- The discovery and location of new or unknown mined areas through the village level identification of mine accident sites.
- The design of appropriate mine awareness curricula through the identification of behavior leading to mine accidents and the types of devices causing the incidents.
- The ability to better help determine priorities for different mine action program components in different locations (mine awareness, survey, clearance, explosive ordnance disposal).
- The monitoring and evaluation of mine action activities.
- Increased awareness of the mine/UXO problem facing the Cambodian people, among the national and international communities.
- Fundraising among mine action and victim assistance agencies throughout Cambodia in the interests of mine victims and mine affected communities.

To date, the primary end users of the data have been MAG and CMAC in the development of their mine action programs; the Cambodian Campaign to Ban Landmines (CCBL) and the International Campaign to Ban Landmines (ICBL); and Geospatial International in support of their National Level One Survey of the Mine and UXO situation in Cambodia. Along with agencies involved in mine action, the project has provided information support to numerous agencies involved in mine victim assistance.

From June to July 2000, UNICEF supported an external evaluation of the HI/CRC's project. The evaluation focused on an analysis of the stated objectives of the project and the system of data gathering employed. Overall, the recommendations were highly positive and will serve to guide the development of the project over the coming years. As of January 2001, the project continued to receive the technical and financial support of UNICEF, and gained additional financial support from the Ministry for Foreign Affairs of Finland and the U.S. Department of State.

Mine/UXO Casualties in Cambodia: 1998-99

Cambodia is one of the most mine-affected countries in the world, both in terms of human casualties and land lost due to landmine and UXO contamination. Following nearly three decades of war, the military situation in Cambodia began to stabilize from 1997-1998, leading to an overall reduction in the number of human casualties caused by mines/UXO. Despite this, mines and UXO remain one of the foremost obstacles to development and are a present threat to the lives and livelihoods of the people of Cambodia, particularly as they enter areas previously inaccessible due to ongoing conflict.

The following section provides an overview of the situation of mine accidents in Cambodia from 1998 to 1999. Throughout this period, HI/CRC utilized 25 full-time data gathering staff and a coordinated network of volunteers, who reported incidents and casualties to the full-time staff. In partnership with MAG and with the technical assistance of UNICEF, data gathering was undertaken in an array of community settings, hospitals and physical rehabilitation centers. Information was gathered on the number, location and circumstances of mine incidents and casualties in Cambodia through direct interviews with casualties, their family members, witnesses to an incident, local authorities, hospital staff or other secondary sources.

Overview of Casualties: 1979-98

From 1979 to 1999, a total of 41,993 mine/UXO casualties were recorded in Cambodia, by HI/CRC and MAG.

- Throughout this period, there was a strong relationship between political violence and the total number of mine/UXO casualties. During periods of civil war casualties increase; during periods of relative peace, casualties decrease.
- Since the emergence of relative peace and stability in Cambodia from 1997 to 1999, mine/UXO related casualties steadily diminished, following a peak in 1996.
- From January 1998 to December 1999, a total of 2,690 people were reported to be casualties of mine/UXO incidents in Cambodia. Of these, 1,685 casualties were reported in 1998, and 1,005 in 1999.
- In 1996, an average of 253 Cambodians suffered mine incidents per month. In 1997, the rate of casualties decreased to 137 a month; in 1998 a slight increase was recorded and an average of 140 casualties per month were reported; while in 1999 the average decreased significantly to less than 84 casualties per month.

A young boy who lost his leg to a mine blast. *c/o ICRC/Tim Mayer*

Kreng Liep holds a photo of her son who was killed when he drove his ox cart over an AT mine. *c/o UNA-USA Debra Boyle*

- The decrease in mine/UXO related casualties may be attributed to a multitude of factors, but the cessation of conflict in 1998, a stabilized political situation, a more settled population with an increased knowledge about the location of mined areas and the mine situation in general, and increased clearance activities all play an important part in a reduction of accidents, though no single factor can or should be attributed to the reduction.

Casualties in 1998-99 by Age and Gender

- Of all casualties in 1998-99, 91 percent were males, while 9 percent were females.
- Among children, as among adults, males made up the majority of casualties. Nonetheless, girls suffered at a higher rate (as compared to boys) than did women (as compared to men). Nineteen percent of the child casualties were girls. Among adults, only 6 percent of recorded casualties were women.
- In general, adults were killed or injured four times as often as children. Children (under 18 years old)[5] made up 20 percent of all casualties.
- Adult males, 18 to 40, suffered the most from mines and UXO.
- However, the casualty rate among children as a proportion of total casualties actually increased.

Occupation

- In both 1998 and 1999, more civilians suffered from mines and UXO than did members of the military. The last year in which military casualties outnumbered civilian was 1996, and civilian casualties as a proportion of total casualties (civilian and military) are increasing dramatically.
- In 1999, the gap between civilian and military casualties widened dramatically.
- Though civilians suffered to a greater degree (in absolute numbers) than members of the military, in relative terms (as a fraction of the total exposed population), members of the military remained at a far greater risk of becoming a casualty of mines or UXO than civilians, though their accidents were not always associated with military activities.

Table 1

	Casualties	% of Total
Men	2,020	75%
Children <18	536	20%
Women	128	5%
Unknown	6	0.002%
Total	**2,690**	**100%**

Table 1. *Total mine/UXO casualties: 1998-1999.*

Injuries

- From 1998-99, the majority of mine and UXO related injuries were wounds (minor and major), while the second most frequent injury type was the amputation of one or more limbs. (see Table 2.)
- Both mines and UXO are more likely to cause amputation and/or wounds to lower limbs than to any other part of the body.
- From 1998–99, 20 percent of all casualties were reported as dying from their injuries, while 80 percent suffered non-fatal injuries. Death was more common among elderly adults (less than 40 years), than for infants, children and younger adults.
- From 1979–99, 34 percent of incidents resulted in death. Though total incidents varied due to political and military factors, the fraction of incidents that resulted in death

Table 2

Injury Type	Cases[6]
Wounds	1,597
Amputation (one or more limbs)	944
Death	550
Burns	265
Blindness	165
Deafness	164
Paralysis	16
Total	**3,701**

Table 2. *Injuries sustained: 1998-1999*

steadily declined over the entire period.
- From 1998–99, casualties suffering amputation or death by mine/UXO were geographically concentrated in the north, northwest and southeast provinces of Cambodia, with little variation between the two types of casualty.

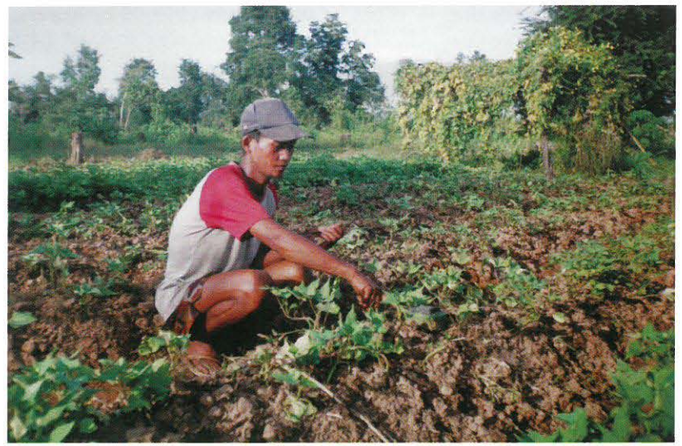
Medical care

- The majority of mine/UXO casualties had their injuries treated either in a provincial or district level hospital (see Table 3.).
- A significant minority of casualties received no medical assistance at all, indicating very minor injuries or death at the site of the incident or enroute to a medical facility.
- The majority of casualties received first aid/care within thirty minutes of suffering their accident.
- Casualties whose access to medical facilities was between 30 minutes and two hours were more likely to suffer amputation than those had access in less than 30 minutes.
- Of the 835 cases of amputation, requiring some kind of orthopedic device, a total of 449 prosthetic devices were received by casualties.

Table 3

Medical Assistance	Casualties	% of Total
Provincial Hospital	828	32%
District Hospital	593	22%
None	383	14%
Unknown	384	14%
Army Hospital	190	7%
Self-treated	104	4%
Other	89	3%
Private Clinic	59	2%
Commune Health Centre	51	2%
Traditional octor	5	0.001%
Wat/monks	4	0.001%
Total	**2,690**	**100%**

Table 3. *Medical assistance received: 1998-1999.*



Cheap Chea points to a landmine that he found in his field.
c/o UNA-USA, Chim Sereivuth

The number is not, however, necessarily a reflection of the effectiveness or lack thereof of orthopedic services in Cambodia, because many casualties may not have been ready to receive a device at the time of their interview.

Cause of Injuries

Device

- In 1998 and 1999, 70 percent of all incidents involved mines and 29 percent involved UXO. (see Table 4)
- Since 1994, incidents involving UXO have increased as a proportion of total incidents, while those involving mines have decreased.
- Children were more likely to be injured as a result of UXO than adults.
- In 1998 and 1999, both mines and UXO incidents varied with the season: wet season and dry season. More casualties were reported during the dry season as rural Cambodians travel more and as they seek alternative sources of income to rice farming. Fewer casualties were reported during the rice planting and harvesting seasons, when populations are less mobile.
- In periods of conflict, mine incidents rise and UXO incidents decrease. In periods of relative peace, mine incidents decrease, while UXO incidents tend to increase.

Table 4

Device	Casualties	% of Tot
Mine	1,885	70%
UXO	768	29%
Unknown[7]	37	1%
Total	**2,690**	**100%**

Table 4. *Casualty causing device: 1998-1999.*

Activities Associated With Incidents

- In 1998 and 1999, the three most important activities that led to mine incidents were: 1) tampering, 2) military activities, and 3) traveling (see Table 5.).
- However, if all activities associated with one's livelihood are taken together, livelihood is the most common associated activity leading to mine incidents, followed by military and tampering.
- Tampering incidents almost exclusively involved UXO, while incidents involving mines were more often associated with livelihood activities.

Table 5

Activity	Casualties	% of Total
Tampering	762	27%
Military activities	514	19%
Traveling	498	19%
Farming	364	14%
Collecting wood	264	10%
Collecting food	134	5%
Herding	55	2%
Fishing	49	2%
Unknown	32	1%
Other	17	1%
Trading	1	0%
Total	**2,690**	**100%**

Table 5. *Incident associated activities: 1998-1999.*

- Children were more likely to be injured while tampering than were adults.[1] Adults were more likely to be injured while undertaking military or livelihood activities than were children.
- Both tampering and livelihood activities followed the same pattern in 1998 and in 1999: they fell during the rice growing and harvest season and peaked during the dry season.
- Military activities led to far fewer total casualties in 1999 than in 1998. At the same time, incidents involving the military followed the same seasonal patterns as those involving civilians, largely because of the "dry season offensives" conducted by the military.

Locations When Injured

- As in previous years, the majority of mine and UXO casualties were concentrated in the northwest of Cambodia. This is particularly true for military casualties, while civilian casualties covered a greater geographic area.
- From 1998-99, a greater concentration of mine and UXO casualties were recorded on the Thai-Cambodia border than were reported in 1997. This is partly explained by a greater capacity of the project to collect data in these areas in 1998 and 1999, following a cessation of conflict.
- Mine incidents (excluding UXO) are more concentrated in the northwest than UXO incidents (excluding mines). UXO incidents are more geographically spread out and a greater number of casualties involved in UXO incidents were recorded on the Vietnam-Cambodia border than mines.
- In 1998-99, Bat Dambang province continued to rank as the province recording the highest number of mine and UXO casualties (see Table 6.).
- In 1998-99, Samlout District, in Bat Dambang province, recorded the highest number of casualties. However, if the number of casualties is taken as a percentage of the total population, Veal Veaeng District, Pousat province, is the most affected district.
- For the same period, Traeng Commune in Bat Dambang province recorded the highest number of casualties. However, if the number of casualties is taken as a percentage of the total commune population, Sala Krau Commune,

Table 6

Rank	Province	Total Casualties	Cum Total	% of Total	Cum %
1	Bat Dambang	790	790	29.4%	29%
2	Banteay Mean Chey	405	1,195	15.1%	44%
3	Otdar Mean Chey	331	1,526	12.3%	56%
4	Preah Vihear	281	1,807	10.4%	66%
5	Siem Riep	169	1,976	6.3%	72%
6	Pousat	149	2,125	5.5%	78%
7	Kampong Thom	126	2,251	4.7%	83%
8	Kampong Cham	107	2,358	4%	87%
9	Krong Pailin	97	2,455	3.6%	91%
10	Svay Rieng	49	2,504	1.8%	93%

Table 6. *Ten most affected provinces for mine/UXO casualties: 1998-1999.*

Krong Pailin province, is the most affected commune.
- From1998 to 1999, Ampil Village, in Bavel District, Bat Dambang province, recorded the highest number of casualties with incidents taking place in villages.

Terrain Type(1998-99)

- The overwhelming majority of mine and UXO incidents (72 percent) occurred in three types of terrain: forests, villages and fields (see Table 7).
- Incidents taking place in fields are seasonally based and occur more frequently in the wet season, while incidents occurring in forests occur more frequently in the dry season. Incidents occurring in villages, on paths and roads, or near rivers do not demonstrate any major seasonal variations.

Table 7

Area Type	Casualties	% of Total
Forest	999	38%
Village	573	21%
Field	363	13%
Path/road	287	11%
Near river	183	7%
Mountain	118	4%
Near military base	108	4%
No answer	43	2%
Other	10	0%
Overgrown area	6	0%
Total	**2,690**	**100%**

Table 7. *Incident location by terrain type: 1998-1999.*

- The majority of incidents (35 percent) took place within five kilometers of village centers.
- For the same period, 39 percent of all casualties were reported to have visited the site of their accident often, prior to the incident taking place.

Mr. Phia lost his leg to a landmine. *c/o UNA-USA Chim Sereivuth*

Mine Incident Prevention
Mine Awareness Training

- Eighty-two percent of casualties were reported as not having received mine awareness training prior to their incident.
- The results indicate either a severe lack in mine awareness training, or the impression that people who receive mine awareness training are less likely to be involved in an accident than those who do not.
- Both women and children received proportionately more mine awareness training than adult men, even though adult men are a higher risk group, suggesting a need to refocus training on them.
- Assuming that a lack of mine awareness among casualties indicates the weakness of the activity, the location of casualties not having received mine awareness training vis-à-vis the rate of casualties indicates a need to reconsider the concentration of mine awareness activities in certain provinces of Cambodia.

Mined Area Marking and Mine Clearance at the Site of the Incident

- Only 2 percent of incident sites were reported as being marked with official mine field markings at the time of the incident.
- Only four percent of incident sites had any previous mine clearance.
- The results suggest that the majority of incidents are taking place in areas not known to be mined, not surveyed, or not prioritized as being high priority for clearance or marking activities.
- The results do not tell us what mine action or survey activities may have been conducted following any reported mine incident.
- The Mine Incident Database Project is performing a vital and unique function within the mine action context in Cambodia and provides valuable information that assists different agencies and governmental bodies in multiple areas of activity. ■

(Chris Horwood and Andrea Crossland, *External Evaluation of UNICEF-Supported Activities to Prevent Mine Incidents*, June-July 2000).

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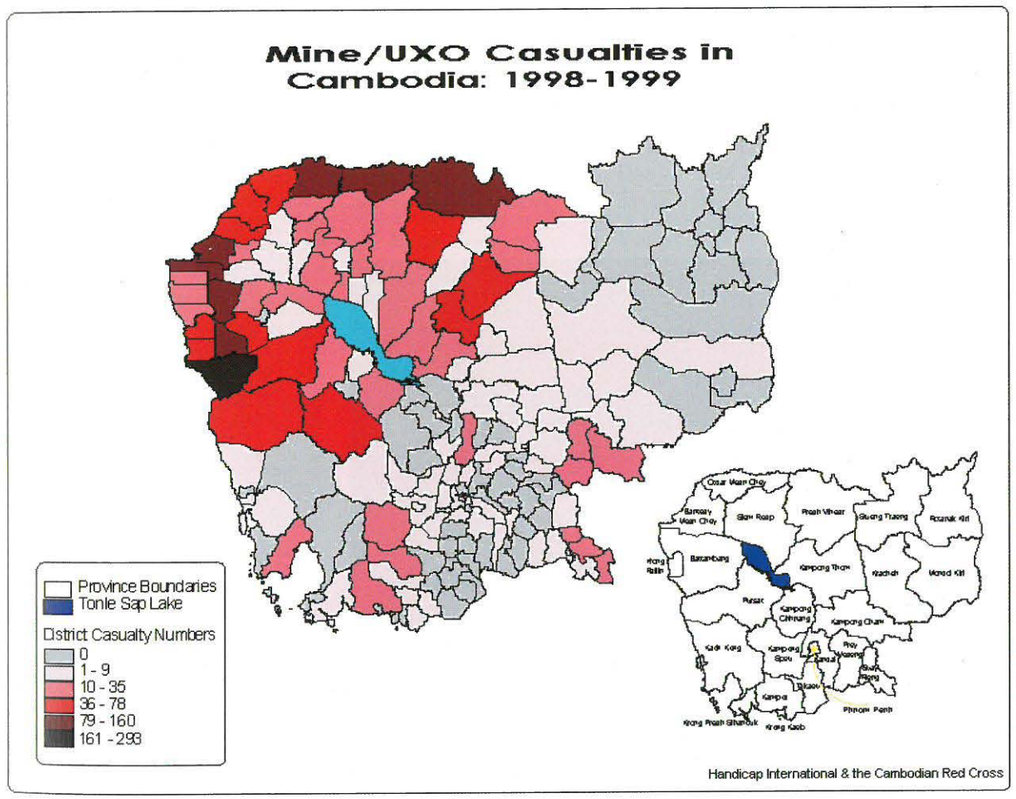
[1] Excerpts obtained from the report *Mine & UXO Casualties in Cambodia: 1998-1999*; Cambodia Mine/UXO Victim Information System (ne. Mine Incident Database Project), September 2000.
[2] Unless otherwise specified, where the term "mine victim/casualty" is used alone it is taken to include UXO casualties.
[3] By September 2000 the number of casualty reports reached in excess of 45,000.
[4] At the time UNICEF was providing financial and technical assistance for both MAG and HI/CRC. In 1999, HI/CRC received additional funding support from the Ministry for Foreign Affairs of Finland, and in 2000 from the U.S. Department of State (Grant: S-PMHDP-00-GG-OO21). The opinions, findings and conclusions contained in this paper are those of the author and do not necessarily reflect those of the U.S. Department of State, the Ministry for Foreign Affairs of Finland or UNICEF.
[5] The definition of a child being less than 18 years of age follows from the definition outlined in the *Convention on the Rights of Children*.
[6] The number of injury cases does not correspond to the number of casualties because many casualties suffered multiple injuries. Injuries that led to death are also included.
[7] *Unknown*: unidentified devices often reported by third parties. Sometimes fuses.
[8] It was a shortfall of the survey questionnaire and methodology during 1998 and 1999 that people who may have witnessed another person tampering with a device and were subsequently injured in an incident were also recorded as tampering.



Korea United:

North & South Set Aside Differences to Demine

Following a historic summit between leaders from North and South Korea, efforts are underway to clear a path through the DMZ. In the South, efforts are also being made to clear the paths civilians use in areas outside the DMZ.

By Keith Feigenbaum, *MAIC*

In a land marred by over a half-century's worth of fierce political divisions and lingering suspicions, agreement and coexistence have come to be as rare as the landmines are plentiful. Such is the troubled state of Korea—from the isolationist Communist North, through the neutral (and heavily mined) demilitarized zone (DMZ), to the revitalized republic in the south. Despite the troubled history of this divided peninsula, steps have been taken recently to put aside ideological differences and focus on the estimated 1.12 million mines in the 4 km-wide DMZ, as well as the tens of thousands of mines in "rear areas" situated outside the DMZ.

In June 2000, leaders from North and South Korea met in a historic summit in Pyongyang. The meeting between South Korean President Kim Dae-jung and North Korea's Kim Jong-il led to efforts to reconstruct the Kyongui (Seoul to Shinuija) railroad and to create a four-lane highway that would link the two countries. Based on the leaders' desire to create this link, the two sides' militaries set out in September 2000 to address the unique mine situation.

Equipped with a mine detonation device, a South Korean K-1 tank drives across a mine field during training to remove landmines. *c/o AP*

Efforts Underway

Unlike many mine-affected countries, the vast majority of mines found in the Koreas have had minimal affects on civilian populations. The Korean Campaign to Ban Landmines (KCBL) estimates that at least 1,000 civilians have fallen prey to mines washed from the DMZ in flooding. Conversely, Koreans have the DMZ to thank for its role as a buffer against the 95 percent of mines suspected to be in Korea. Of South Korea's estimated 1.2 million mines, only about 68,000 have been located outside the DMZ in rear areas.

Rachel Stohl, a senior analyst for the Center for Defense Information, writes, "The landmine problems facing North and South Korea differ from those encountered in other countries afflicted with large numbers of mines. For the most part, mines in Korea are concentrated in well-designated 'fields' along the DMZ and surrounding areas and do not affect farming, industry or other segments of 'normal life…' The enduring danger from landmines in Korea, once the known fields are removed, ought to be much less than in countries such as Cambodia and Vietnam."

Of course, while the landmine situation may differ from that of other affected countries, threats such as unmapped mine fields, floods that carry mines out of mapped areas (and often outside the DMZ) and the unknown nature of the mine problem in North Korea add an air of uncertainty to the overall situation.

Demining in Rear Areas

While the DMZ is widely known to be a dangerous, mine-affected area, the effects of mines on other regions of the Koreas are less publicized. Meanwhile, the effects on areas outside the DMZ in North Korea are shielded from the outside world. But, in South Korea, landmines have been identified in areas frequented by civilians. The mines found in these areas, more so than those located in the DMZ, pose a definite threat to civilians as many have been displaced through flooding or are unmapped.

A November 2000 edition of *The Korea Herald* reported that the environmental group Green Korea United (GKU) identified large numbers of landmines "planted in and around Seoul and other large cities, as well as national and provincial parks." GKU has noted 21 mine-affected areas in the following South Korean provinces and cities (number of mine-affected areas in parentheses): Kyonggi and South Kyongsang (4), South Chungchong (3), Pusan and South Cholla (2), and Seoul, Taegu, Ulsan, Kangwon, North Kyonsang, and North Cholla (1 each).

GKU Secretary General Lim Sam-jin told the *Herald*, "In most of the mined places, mine warning signs are easily found near villages, meaning the safety of civilians is threatened."

In response to these threats, the South Korean Joint Chiefs of Staff (JCS) announced in February 2001 it would remove all mines in rear areas by 2006—the same year South Korea and the United States plan to sign the Mine Ban Treaty, contingent on the development of acceptable mine alternatives. The JCS expects to begin this effort by clearing about 6,000 APLs (the only type of mine reported to be found in rear areas) from these locations: two former air defense bases on Mt. Chungni in Pusan and in Kumo-ri in Hadong County, South Kyongsang Province, Haeundae in Pusan, Mt. Kumdan in Songnam, Kyonggi and Kwangju.

The JCS expects the upcoming demining efforts to put a significant dent in the already reduced number of mines outside the DMZ.

In a *Herald* article from Dec. 23, 2000, a South Korean Joint Chiefs of Staff (JCS) official said, "The army completed the removal of some 1,100 AP mines planted on top of Mount Kumho [sic] this year, where Nike missile radar systems were located. We have cleared a total of 6,800 mines in seven spots [since 1996] to reduce the number of landmines planted in the rear areas to around 68,000."

To aid the military in demining Korea's rear areas, GKU, KCBL and the Japan Campaign to Ban Landmines (JCBL) have also reportedly agreed to begin efforts to map mine fields. According to KCBL Coordinator Cho Jai-kook, the efforts will include surveys of three mine-affected areas that pose a threat to the lives of civilians and soldiers: two of the 21 locations identified by GKU as mine-affected, U.S. Air Force bases surrounded by AP mines and "civilian passage restricted areas" located from 3 km to 30 km south of the DMZ.

Railroad-Highway Construction Route

On September 18, a force of about 2,800 South Korean soldiers set out to take on the difficult task of ridding the train and highway construction route of its estimated 100,000 mines. Of the 2,800 officers, 700 were dispatched from field engineer battalions to begin mine clearance work with a deadline of December 2000 in place (since postponed to September 2001), an official from the South Korean Defense Ministry told the *Herald*. Meanwhile, the North Korean military was also reported to have begun clearance efforts on September 4, removing trees and other obstacles.

Adding complexity to the mine situation is the fact that of the estimated 100,000 mines in the construction route, only 3,000 are in confirmed areas. This, along with the short timeframe allotted for clearance efforts, caused demining to be suspended in mid-December. South Korean defense officials expect work to resume following the spring thaw in March 2001. Lt. Gen. Sun Young-jai of the South Korean Army told the *Herald* on Sept. 19, 2000: "Our schedule for the mine clearance is flexible as we are putting top priority on the safety of soldiers. We have prepared various safety equipment and methods for our soldiers."

Demining the DMZ

A variety of demining methods—noted by a variety of sources—have been identified as potential clearance methods to be used in creating a path through the DMZ. The South Korean Defense Ministry told the *Herald* in August 2000 of its plans to initiate a six-stage clearance program (see box on next page for elements of this program).

The equipment used by deminers was expected to consist of a mix of foreign and Korean tools and vehicles. "We have designed remote-controlled 'armored buckets' with thick steel plates and bulletproof windows attached to heavy equipment such as excavators, bulldozers, cranes and water sprinklers to be used for mine removal," Lt. Gen. Sun said. "With these safety measures, soldiers will be able to do most of their work without setting foot on the ground, thereby

South Korean soldiers move to the next position after removing a mine field fence as an armored mine clearing vehicle pulls foward during operations. *c/o AP*

Anticipated Mine Clearance Procedures:

- Use of water sprinklers to uncover mines.
- Insertion of 15-meter-long plastic pipes filled with dynamite and detonators into suspected areas (for mines up to 10 cm underground).
- Use of excavators and bulldozers to remove plants and dig up earth (for mines 20 to 30 cm underground).
- Final inspections by soldiers to ensure the removal of all mines.

greatly enhancing the safety of deminers."

Another method reported to be under consideration by the South's Defense Ministry was a "scorched earth policy." This method would involve spraying fuel along the South Korean portion of the DMZ between the Imjin River and Changdan in Munsan and then burning the fuel.

More Help on the Way?

Although mine clearance and mine identification efforts in both rear areas and the DMZ have thus far been limited to the military and civic groups, in January the South's Sungdo Construction Co. created the demining firm Specialist Demining Engineering (SDE) to aid the Koreas and other mine-affected nations in clearance efforts. The firm's vice president, Koo Ja-ho, recently said the SDE has formed a "technical assistance agreement" with the UK's Specialist Gurkha Services (SGS)—one of the world's top-10 mine and UXO clearance companies. Koo expressed to the *Herald* a desire to aid the Korean governments' demining efforts, saying that private firms are at an advantage over militaries when it comes to insuring operations, gaining funding, and securing the most advanced equipment.

To date, no formal agreement between the private firm and the Korean governments has yet to be announced. However, JCS Battle Coordination Division official Lee Kang-soo, head of mine affairs in the division, recently told the *Herald* the

continued on page 30

Southeast Asia
Air Combat Data

The Defense Security Cooperation Agency's Tom Smith details the United State's efforts to create an informational and relational database for mine/UXO identification in Southeast Asia and its importance in targeting landmines.

by **Tom Smith,**
Defense Security Cooperation Agency, Office of Humanitarian Demining

One of the greatest challenges in the global effort to remove the deadly debris of war and conflict is the collection of records kept by the combatants from either side in the conflict. In that regard, the United States has realized the importance of, and is making available, data from a variety of sources to assist with the survey and clearance work in Southeast Asia.

DSCA Defense Security Cooperation Agency

Since 1994, the humanitarian demining offices in the Defense Security Cooperation Agency (DSCA) and U.S. Pacific Command, in conjunction with the Federal Resources Corporation and MRJ Technology Solutions, have been developing an informational/relational database derived from the separate declassified tapes of allied air combat and combat support operational activities conducted during the war in Indochina. The output of this analysis will provide nations in the region with accurate target and ordnance data so that host countries can set priorities for UXO clearance operations and assess the probability of UXO contamination in areas identified for economic development.

These combat missions were conducted in Cambodia, Laos, and Vietnam from 1965 to 1975. The original data system was developed by IBM in the early 1960s and captured daily air combat information on the Vietnam conflict in the National Combat Command Information Processing System (NIPS). The data (classified Top Secret) was maintained by the Joint Chiefs of Staff and in 1976 declassified and delivered to the National Archives for safekeeping.

Four major databases are being reviewed for information that will assist host nations in determining the scope and scale of air bombardment, helping to prioritize bomb and mine clearance operations:

Files Accessed & Data Period

Combat Activities File (CACTA)
October 1965 - December 1970

Southeast Asia Database (SEADAB)
January 1970 - June 1975

Strategic Air Command's Combat Activities report (SACCOACT)
June 1965 - August 1973

Herbicide Data Files- (HERBS)
July 1965 - February 1971

Other databases to be reviewed include the Combat Naval Gunfire Files, Mining Activity Files, and other files relating to friendly and opposing force base camp and artillery data.

Data in the air combat files includes specific mission numbers, type and number of aircraft, location of target, latitude/longitude coordinates, ordnance type, number of ordnance dropped, and additional information on downed aircraft.

The goal of this combined effort is to provide host nation mine action offices with geospatial information (maps, digital, and other data) to support humanitarian demining surveys, setting priorities for demining operations, training, and assessment of the mine and UXO threat to economic development activities. The recovered data are being incorporated into geospatial databases for analysis by the host nation mine action centers using Geographical Information Systems (GIS).

Information for Laos has been retrieved, incorporated into a relational database, and installed at the headquarters of the Lao National Unexploded Ordnance Program (UXO LAO) in the capital city of Vientiane. The air combat information is displayed with vector or raster geospatial data and used to plan UXO clearance operations and to assess the probable impact of UXO on economic development projects.

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South Korean soldiers move to the next position after removing a mine field fence as an armored mine clearing vehicle pulls foward during operations. *c/o AP*

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Files Accessed & Data Period

Combat Activities File (CACTA)
October 1965 - December 1970

Southeast Asia Database (SEADAB)
January 1970 - June 1975

Strategic Air Command's Combat Activities report (SACCOACT)
June 1965 - August 1973

Herbicide Data Files- (HERBS)
July 1965 - February 1971

Other databases to be reviewed include the Combat Naval Gunfire Files, Mining Activity Files, and other files relating to friendly and opposing force base camp and artillery data.

Data in the air combat files includes specific mission numbers, type and number of aircraft, location of target, latitude/longitude coordinates, ordnance type, number of ordnance dropped, and additional information on downed aircraft.

The goal of this combined effort is to provide host nation mine action offices with geospatial information (maps, digital, and other data) to support humanitarian demining surveys, setting priorities for demining operations, training, and assessment of the mine and UXO threat to economic development activities. The recovered data are being incorporated into geospatial databases for analysis by the host nation mine action centers using Geographical Information Systems (GIS).

Information for Laos has been retrieved, incorporated into a relational database, and installed at the headquarters of the Lao National Unexploded Ordnance Program (UXO LAO) in the capital city of Vientiane. The air combat information is displayed with vector or raster geospatial data and used to plan UXO clearance operations and to assess the probable impact of UXO on economic development projects.

Herbicide mission data has also

been incorporated into the GIS at UXO LAO. Herbicide mission data was obtained from the U.S. Armed Services Center for Research of Unit Records (CRUR) that is also the source for substantiation of veteran's claims of herbicide contact. Data includes the original HERBS tapes plus man-portable, truck, and helicopter missions that were conducted during the conflict.

The partnership between the DSCA and its contractors is also in the process of developing a user-friendlier informational/relational database and look-up tables to better assist the end user in planning for and prioritizing bomb clearance missions in specific areas of the country. A prototype internet-accessible version of the geospatial data is also in the developmental phase and will make it easier for host nations to access the data without a major investment in information technology equipment.

Maintaining the work on this project is essential for continuing assistance to Laos and possible expansion to the Cambodian Mine Action Center (CMAC) and the newly established Vietnamese Centre for Treating Technology Bombs and Mines. The project will continue to support our government's engagement strategy in the region.

In October 2000, a senior Vietnamese military delegation visited the United States to observe demining training activities and discuss ways in which the two countries could begin engagement by sharing information on demining issues. The delegation was extremely impressed with the bombing data retrieval project and, as a result, former President Clinton offered to share the information with the Vietnamese government during his historic visit to Vietnam in November 2000. Efforts are underway to coordinate the development and support of this initiative with the Government of Vietnam.

The use of this kind of data, and the integration with facilitating technologies, is unprecedented and is a clear demonstration of the value that technology can play in enhancing demining efforts, reducing costs, and building cooperative efforts between nations. The skills being learned through this process and the knowledge gained will most certainly be of value in other countries and other situations. This and other like initiatives will help ensure that the world will become mine safe sooner rather than later. ■

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Korea United

continued from page 28

South Koreans are considering cooperating with SDE in clearing the estimated 20,000 mines on Mt. Chungni.

The End in Sight?

When the Korean soil thaws in early spring and the demining effort is continued, the Koreas will be en route to clearing a path not just through the DMZ, but through years of silence and conflict. Though we may never know of advances in clearance operations and mine awareness on the northern side of the DMZ, the North's pledged cooperation with the South is a huge step towards reconnecting the once united peninsula. Even the People's Republic of China has pledged technical and personnel support to both Koreas' efforts, according the August 23, 2000 *Yonhap News*. It could be said that the mine situation in Korea pales in comparison to such places as Bosnia-Herzegovina or Afghanistan. Perhaps this is true from a numerical standpoint. But when one considers a country divided in two by a guarded, man-made boundary and by stark ideological differences, there are few, if any, situations to rival that of the Koreas. If, in fact, the drive to clear a path for railroad and highway construction is successful in September 2001, the joint efforts of enemies will be responsible for partially reversing in about one year what took over 50 years of animosity to create. ■

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Pakistan: The Landmine Problem in Federally Administered Tribal Areas

After a decade of fighting, the effects of conflict beyond Pakistan's border with Afghanistan are seen everyday in border regions. With little government aid available, agencies like HSD are taking the initiative in the country's battle against mines.

by **Faiz Muhammad Fayyaz**, ***Executive Director, Human Survival & Development (HSD)***

The ravages of the decade-long armed conflict in Afghanistan between the Soviets and anti-communist forces were not confined to Afghanistan. Rather, its ill effects spilled over to neighboring countries. One effected country of note was Pakistan, which was used as a base for war activities. Pakistan served as a home to arms depots and camps for training guerillas, and as a passageway for logistic supplies and other activities for the coordination of the war effort. In addition, throngs of refugees crossed the Afghanistan-Pakistan border in search of safe harbor, rendering the border weaker and weaker throughout the war.

One of the most detrimental effects of the Afghani war on Pakistan was the thousands of landmines left behind in Federally Administrated Tribal Areas (FATA). Soviet troops dropped mines and bombs in FATA border towns in order to intimidate the local population and prevent any support of anti-communist forces. Although the Afghan war broke out in December 1979, it wasn't until the early-1980s that the landmine problem surfaced in the FATA. Of the seven tribal Agencies of the FATA, Bajaur and Kurram were the most effected, counting an alarming number of casualties.

Bajaur and Kurram have witnessed some of the worst casualties, which affected not just soldiers but women and children, as well. An entire disabled population now exists—a change that has effected the socioeconomic fabric of the area. While the FATA was socially underdeveloped previous to the war, it has regressed further as a result of mines. The region's inadequate health services must deal with a public health situation of tragic proportions. Agricultural land has been rendered un-productive. Once productive men responsible for earning livelihoods have not only been rendered unproductive, but have become liabilities. Children have been forced to perform hard labor and beg on the streets.

Assessment

In order to assess the depth of Pakistan's landmine problem, 1997 Nobel co-laureate Rae McGrath, an authority on landmines, visited Human Survival and Development (HSD) in the summer of 2000 at the behest of the Swiss Federation for Mine Clearance and Swiss

Shaima, 9, waits to have her prostheses adjusted at the ICRC workshop. *c/o ICRC/Adrian Brooks*

Foundation for Landmine Victim Aid (HSD donors). McGrath visited the affected areas, met with locals and interviewed victims. He compiled a detailed assessment report that proffered suggestions and recommendations, substantiated our assertions and initial research, and called for support for a mine action project in response to the humanitarian disaster in FATA.

Following McGrath's assessment, HSD initiated a mine action program in Bajaur Agency through funding from the Swiss Federation for Mine Clearance and the Swiss Foundation for Landmine Victim Aid. This program is dedicated to the safety and integrated rehabilitation of mine victims of FATA, functioning apart from the humanitarian mine clearance effort. Specifically, the program consists of Basic Mine Awareness (BMA) and Risk Avoidance (RA) education and physical and socioeconomic rehabilitation of the mine victims. Locals are also interviewed throughout the program to determine household data. At present, HSD is engaged in BMA and RA and collection of household data. It has recorded data for 599 mine victims and educated about 25,000 locals.

ICRC orthopedic center in Wazir Aklbar Khan. *c/o ICRC/Zalmai Ahad*

Rehabilitation

HSD's philosophy on rehabilitation goes beyond the practice of mere physical rehabilitation, the provision of means of mobility, and prosthesis/orthotics. It also involves the integration of socioeconomic rehabilitation. For this purpose, HSD has planned in its project to provide the victims with skill development training and micro credits to establish and operate viable and profitable micro enterprises. In this way, the mine victims will be able to earn steady incomes to support themselves and their families and become reintegrated into the household, community, and society.

To aid in rehabilitation efforts, HSD has installed a mine victim database. The database is part of a larger management information system (MIS) that includes, besides the database for mine victims, a geographical information system (GIS). In addition to that, it has a package for HSD finance. A package for administration will also be developed, while a database for BMA and RA education is being perfected. HSD has also proffered a progress report on the conduction of operational activities commenced on August 2, 2000.

FATA Breakdown

FATA is a collection of seven agencies, which, unfortunately, have been neglected by successive governments in Pakistan for the last 50 years. The policy of status quo has prevailed in these areas, disallowing any concrete social progress. FATA is geographically linked to the NWFP and constitutes these seven tribal agencies (six of which share a freely passed border with Afghanistan): South Waziristan, North Waziristan, Kurram, Orakzai, Khyber, Mohmand and Bajaur. Located within the seven districts are six tribal areas or Frontier Regions, which constitute an area of 27,220 sq. km, or 2.6 percent of the total area of Pakistan: Peshawar, Kohat, Bannu, Lakki, Tank, and Dera Ismail Khan. The region consists of 3.1 million generally conservative, religious people.

Bajaur Agency

Bajaur valley (area of 600 sq. miles) is a hilly area located northwest of Malakand. The approximate population of 364,000 comprises two main tribes—the Tarkhanis and Utmankhels.

BMA and RA

BMA aims to reduce casualties by promoting safe behavior and facilitating appropriate responses to the problem. In general, programs provide information on the identification of mines and UXO and the dangers they pose, and seek to teach safe behavior to civilians living in or moving into mine-affected areas. This includes guidance on how to recognize a potentially mine or UXO-contaminated area, as well as what to do if someone accidentally finds himself in the middle of a mine field. Instruction in basic first aid for mine victims is often a part of the program.

Teaching BMA and RA, especially to the most vulnerable groups, is important in Bajaur due to its landmine situation. About two mine-related incidents occur weekly in the area, generally as a result of a lack of mine awareness training. Children and women are among the most vulnerable groups that have become mine victims. BMA and RA, which were instituted in Bajaur on August 2, 2000, are also an important pillar of HSD mine action strategy. In the absence of these educational programs, the magnitude of the mine threat is multiplied.

In an area with an unusually high death ratio, the HSD field team prioritizes the teaching of first aid as part of its mine awareness program. Measures taught include stopping profuse bleeding and learning to guard against infections, shocks or other typical afflictions. HSD performs this training in an attempt to remedy the lack of first aid training in the community and a lack of effective transport. In general, casualties must be initially transported to the local hospital for first aid and then to the provincial metropolis hospital for treatment. By the time victims reach the hospital, colossal amounts of blood are lost. HSD's training would allow victims' initial treatment to be done on site.

To combat this problem on another level, HSD has also secured two ambulances through its donors. These will be stationed in close proximity to the community of Bajaur to pass casualties to an equipped medical center. One of them is ready to be sent from Geneva.

Since August 2000, HSD has educated about 30,000 community members in schools, Madrassas (religious schools), mosques, hujras (places for men to gather), and bazaars. The community has now largely accepted the mine awareness program and is cooperating with HSD teams. Children, in particular, are displaying keen interest in the class because of the easy and culturally appropriate medium of communication—Pushto—the local language. Due to the cultural practice of excluding women during mine awareness sessions in the schools, mosques and public places, the HSD team urges the audience to transmit the lessons to the females of the community, as well. After several meetings between the HSD executive director and other staff members with community elders and religious groups, the team has been allowed to gain access to the female children in the schools and mosques for conducting awareness classes.

Throughout the course of HSD field activities, we have observed that the community has a few strange and dangerous ways of responding to landmines and casualties. Our team discovered that members of the community use whey (yogurt beaten to liquid form) over a victim's wounds. This is not an isolated occurrence, but a widely practiced exercise—a fact borne by the household survey HSD conducted. Admittedly, this is harmful practice. HSD is attempting to raise awareness in the community against the potential harm held by this practice. A second dangerous practice widely seen in Bajaur is the shooting of mines with a gun or stoning mines as a mine clearing strategy, as determined by HSD surveys. Finally, a few of the community members have bought poor quality mine detectors from the black market and used them in inappropriate manners. With no formal training from a mine action expert, the result has been a number of accidents. The community is also not familiar with any safe victim evacuation methods. Multiple casualties often result from the presence of multiple mines in the vicinity of the victim.

Women must receive mine awareness education separately from the male population. *c/o Faiz Muhammad Fayyaz*

Mine Awareness Materials

HSD developed its mine awareness material after considering the needs and suffering of the local community. It includes wooden mine models (appropriately painted) of the common types of mines found and used in the region. In addition, there are two kinds of posters—one depicting common types of mines found and used in the region and the other showing landscapes with mine problems. Both these tools are used for instruction in the field. The clear and simple message on the printed materials appears to be assimilated by the community.

HSD is using places like mosques, schools and hujras for conducting its BMA and RA classes. Such locations ensure maximum attendance of all age groups of the community. Children and teachers are the target group in

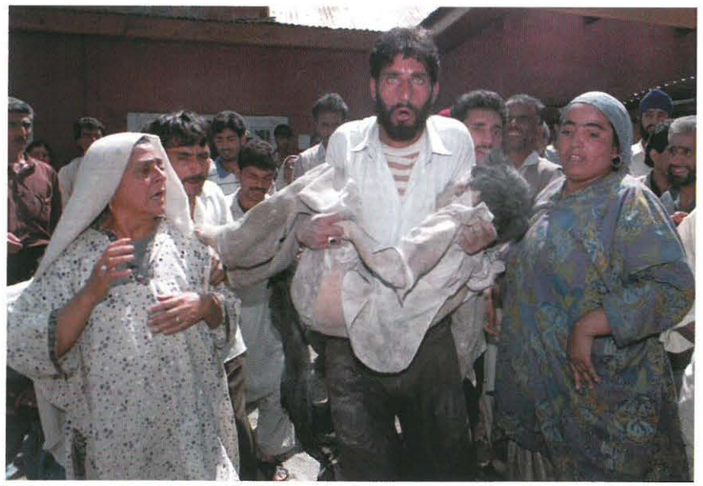
schools. In mosques, mullahs (religious groups) and other male members of the community assemble for prayers five times a day. In hujras, the elders of the community and youth commonly get together for entertainment. The aim is to maximize the reach of the classes and ensure that the composition is wide ranging.

HSD BMA and RA education team uses class teaching methodology for instructions. As per the tenet of BMA and RA education, HSD's team has made it a point not to touch the dummy mines in presence of children who have a proclivity to imitate and tamper with novel things. Mines are laid before children are allowed to arrive in the class and a wand is used to point to mines.

Child-to-Child and Child-to-Woman Technique

HSD has employed child-to-child and child-to-woman techniques in order to spread its BMA and RA messages. Children have strong learning faculties, as compared to adults. They are active and energetic, hence efficient and effective transmitters. Curiosity is a part of their built-in behavior pattern. We have discovered that the feedback from the children in Bajaur is mostly encouraging. Pushto serves as a very smooth, efficient and effective vehicle of communication. Children are also helpful in carrying our message to women.

Children make up about 45 percent of the total subjects HSD has covered so far. Their vulnerability is apparent in that they constitute 27 percent of the recorded casualties (see *Household Survey* table). HSD is using child-to-woman and male-to-female techniques to transmit and extend its message to women. As the community is very touchy on the issue of women, it is difficult to reach out to them.



A father carries the body of his son who was killed in a mine explosion. *c/o AP.*

Case Studies

Mohammad Zaman is one of six children of Rehman of Bar Gabaray, Tehsil Mamund, Bajaur Agency. On May 12, 1987, Mohammad brought home a piece of UXO. Due to a lack of mine awareness education, he did not foresee the danger inherent in the UXO. He struck the UXO with stones until it went off. It was at a time when his parents and siblings were busy with their routine household chores. As a result of the explosion, he, his mother and his sister died instantly, while his father and another sister sustained serious injuries.

On Dec. 15, 2000, a large, Russian-made UXO exploded while children were playing with it at the residence of Hakim Khan of Gabaray. The explosion claimed the lives of six innocent children. The bodies of the children were badly mutilated. Another child was badly injured.

However, HSD has managed to access some female schools where female teachers received our message. These teachers can also serve as effective transmitters. Moreover, feedback we have received from the community indicates that a child-to-women/male-to-female technique is proving to be fairly effective. Meanwhile, HSD is attempting to devise an efficient and effective way to transmit BMA and RA messages to women.

Household survey

The extent of the landmine problem in FATA warrants significant concern—a fact that was ignored for years by the government at the worst possible time. It officially recognized the problem for the first time in reports submitted to the CCW in December 1999.

HSD recognized the imperative need to address the problems FATA. It formed a general theoretical perspective of the problem, and laid it forth nationally and internationally. Fortunately, it has succeeded not only in securing recognition for the problem, but also in securing funds for a project to rehabilitate the landmine victims of FATA.

HSD aims to achieve comprehensive rehabilitation of mine victims to help them return to normalcy. This will be possible through their physical, social and economic rehabilitation. Physical rehabilitation will involve the provision of prostheses and means of mobility, whereas socioeconomic rehabilitation shall require providing the victims with support to earn steady, decent income.

The HSD project provides skills development training and micro finances for this purpose. The victims are supported to run viable, profitable micro enterprises that produce steady incomes. They will be helped to perform normal social functions so that they will be accepted by society. We required a large base of knowledge and data for the planning of these activities. Obviously, an interview with household survey was made to collect all the data needed for planning these activities.

Statistics show that males aged 12–18 form a particularly vulnerable demographic group. *c/o Faiz Muhammad Fayyaz*

Database

It is imperative that the planning and execution of the database portion of the mine action project include information on the physical and socioeconomic rehabilitation of mine victims. Data has to be gathered and wielded not only to ascertain the extent and nature of physical disabilities, but also to determine the socioeconomic status of the community. Only then can the provision of prostheses, skill development training, and micro credits be planned and executed. It is obvious that HSD needs a database for the processing and analysis of such a big volume of data. It would take a great effort on the part of HSD staff to wield such a large volume of data manually, let alone process and analyze information, without the database HSD has assembled on incidents from August to October 2000.

The table shows the distribution of casualties by death, amputations, and injury. It is evident that Mamund Tehsil of Bajaur Agency has been one of the most affected by landmines. It has one of the most alarming death tolls: 220. There were also 186 amputations and 63 injuries. Nawagai Tehsil has also counted 33 deaths and 30 amputations. The death ratio would not have been so high had there been efficient transports to carry the victims to an equipped landmine casualty medical center following incidents. In Bajaur, it usually takes one and a half to four hours before a victim receives first aid. By the time victims reach an equipped medical center, they have lost large amounts of blood and their injuries often become infected.

Casualties (Tehsil)

Tehsil	Casualties			Total	Percentage			Total
	Death	Injury	Amputations	Casualties	Death	Injury	Amputation	Percent
Khar	1	5	18	24	4.17	20.83	75.00	100.00
Mamund	220	63	186	469	46.91	13.43	39.66	100.00
Salarzai	5	2	15	22	22.73	9.09	68.18	100.00
Utmankhel	0	0	1	1	0.00	0.00	100.00	100.00
Nawagai	33	15	30	78	42.31	19.23	38.46	100.00
Barang	1	0	0	1	100.00	0.00	0.00	100.00
Total	**260**	**85**	**250**	**595**	**43.70**	**14.29**	**42.02**	**100.00**

Under these circumstances, it is not difficult to understand the high death and amputation rates in Bajaur.

As seen in the previous table, the percentage of female landmine victims in Bajaur, as compared to other landmine-affected countries or regions, is on the higher side. This could be a result of the local gender division in labor (that excludes women) and the resulting significant role of women in the local agrarian economy. Women generally help in harvesting, collecting firewood, cutting fodder for the cattle, and carrying water to the home. They are also responsible for tending cattle. All of these activities increase their vulnerability to mine incidents. Subsequent data on this matter should help HSD in coming up with concrete findings and conclusions to replace the current provisional and hypothetical findings.

From the table, it is apparent that Bajaur became infested with landmines after the breakout of the Afghan war in late-1979. Through forthcoming data, HSD will attempt to interpret the wide fluctuation of incidents in the 1990s. The cause of this fluctuation from the 1980s to the 1990s is currently unclear. HSD will refrain from drawing any conclusions from this data until more conclusive research is completed.

However, our hypothesis is that those who had migrated to safer places in the 1980s returned to their homes in the 1990s, when Soviet troops left Afghanistan and the areas near the border came under the control of the Mujahideen, who were struggling to gain control of Pakistan.

The overall death and amputation numbers are also on the high side compared to other mine affected countries. According to Handicap International's 1997 report on Cambodia, the rates of death, amputations and injury were 20, 22 and 58 percent, respectively. Out of the total 1,369 casualties, deaths, amputations and injuries numbered 271, 307 and 791, respectively. In Bajaur, the death and amputation percentages for 1997 were 44.9 percent and 37.76 percent (out of 98 incidents), respectively. The ratios for death and amputation in Bajaur are double that of Cambodia. Injuries accounted for 58 percent of casualties in Cambodia, compared to 17.35 percent of casualties in Bajaur.

Victims by Gender (Bajaur Agency)

S #	Gender	No.of Incidents	Percent
1	Male	389	65.40
2	Female	206	34.60
	Total	**595**	**100.00**

Victims by Age (Bajaur Agency)

S#	Age Group	# of Incidents	Percentage
1	0 - 10 Years	92	15.46
2	11 - 18 Years	81	13.61
3	19 - 30 Years	168	28.24
4	31 - 40 Years	112	18.82
5	41 - 50 Years	81	13.61
6	51 - 60 Year	43	7.23
7	Above 60 Years	18	3.03
	Total	**595**	**100.00**

Activity during Casualty

It stands out from the data that the presence of landmines in Bajaur is impeding agricultural activity, as the largest number (158) out of 584 accidents has occurred during farming and the number of casualties (58) while crossing agricultural fields is the third largest figure. This is not surprising, as agriculture is the mainstay of Bajaur's economy. Most people are engaged in farming and thus run the risk of being injured by a mine. The second largest figure is that of casualties during walking (107). People fall victim to mines while going to mosque, fetching water and during other routine walks for indispensable things. Children have been hit by mines while playing (29). Others have been crippled (25) while collecting firewood, an activity very common in an agricultural, tribal economy. While the number of incidents resulting from mine tampering is not large (10), this is a common occurrence in the community. In some instances, though, parents may have refrained from divulging the fact that an accident occurred during tampering due to a fear of losing compensation from HSD.

It is highly evident that landmines interfere with daily life in Bajaur. Mines and UXO have injured no one during non-essential activities. The socioeconomic status of the region has been altered immeasurably. Even some children have been prevented from attending school for fear that they will encounter mines while en route. This, in an a place where the literacy level is already threatened.

Methodology

Designing and Development of Interview Schedule

With the help of its field staff, HSD developed a suitable interview schedule after thoroughly studying the landmine problem in Bajaur. It had help from the already tested tools of Handicap International, the guidelines of Physicians for Human Rights and other similar organizations working for the collection of data on landmine victims.

Training and Orientation of Field Staff

The HSD field staff was duly trained and oriented before deployment in the field. Dr. Anwar Hussein, assistant professor at NWFP Agriculture University's Institute of Development Studies (IDS) in Peshawar, Pakistan, held sessions with field staff and trained them in interview techniques. Dr. Hussein is also a member of the HSD Board of Directors. Rae McGrath has continued to aid HSD as a consultant, using his rich and versatile experience to help the staff.

Initiating Volunteerism in the Community

HSD has initiated the trend of volunteerism in the community and received a positive response from the community. Various members of the community, ranging from farmers to students, have shown keen interest in volunteering with HSD. They have offered their services on a humanitarian and service basis for the noble enterprise.

Currently, HSD is working to train volunteers from the community, common people, schoolteachers, religious teachers and leaders, and the youth to carry out humanitarian jobs on a volunteer basis. This is particularly essential when it comes to training people to treat fellow citizens through first aid.

As a final note, it would benefit HSD's mine awareness program to find women volunteers among the community who could act as liaisons between other females in Bajaur. As was earlier expressed, the female segment of the population is effected on a daily basis by mines, but is prevented by their social standing from participating in mine awareness training. This situation must be addressed if the mine situation in Pakistan's FATA is to improve. ■

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Victims by Year (Bajaur Agency)

Year	Casualties			Total	Percentage		
	Death	Injuries	Amputations	Casualties	Death	Injury	Amputation
1980	0	0	1	1	0.00	0.00	100.00
1980	5	2	4	11	45.45	18.18	36.36
1982	4	0	3	7	57.14	0.00	42.86
1983	0	0	1	1	0.00	0.00	100.00
1984	3	0	2	5	60.00	0.00	40.00
1985	3	1	11	15	20.00	6.67	73.33
1986	16	1	1	18	88.89	5.56	5.56
1987	9	2	2	13	69.23	15.38	15.38
1988	18	2	9	29	62.07	6.90	31.03
1989	5	0	4	9	55.56	0.00	44.44
1990	29	11	34	74	39.19	14.86	45.95
1991	6	2	3	11	54.55	18.18	27.27
1992	14	1	18	33	42.42	3.03	54.55
1993	7	2	9	18	38.89	11.11	50.00
1994	19	8	11	38	50.00	21.05	28.95
1995	19	7	27	53	35.85	13.21	50.94
1996	13	8	22	43	30.23	18.60	51.16
1997	44	17	37	98	44.90	17.35	37.76
1998	28	7	23	58	48.28	12.07	39.66
1999	12	3	14	29	41.38	10.34	48.28
2000	6	11	13	30	20.00	36.67	43.33

**All charts and graphs supplied by the author.*

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Myanmar's Forgotten Mine Fields

On the subject of landmines, media attention is rarely focused on Myanmar. Yeshua Moser-Puangsuwan and Andrew Seith examine the country's manufacture and indiscriminate use of mines and IEDs.

by Yeshua Moser-Puangsuwan and Andrew Selth

There are an estimated 120 million-plus uncleared anti-personnel (AP) landmines around the world, scattered through more than 60 countries. In all the literature produced on this subject to date and in discussions of the problem in international forums, mention is rarely made of Myanmar (formerly Burma). This is despite the fact that anti-personnel landmines have been, and are still being, manufactured and laid in large numbers in that country. Indeed, the number of landmine casualties now surpasses Myanmar's mine-affected neighbor, Cambodia, which has been the subject of much greater world attention.

Landmine Use in Myanmar

The use of landmines and improvised explosive devices (IEDs) has been a feature of armed conflict in Myanmar since it regained its independence from the UK in 1948. Before the 1960s, fighting between the Myanmar armed forces (Tatmadaw) and the country's many ideological, ethnic and religions insurgent groups was bitter. There has also been a long-running war between the Myanmar armed forces and a number of narcotics-funded private armies. All sides, however, found it difficult to obtain regular or plentiful supplies of modern munitions. This prevented the extensive use of commercially produced landmines and forced the protagonists to rely more on IEDs. These still resulted in a large number of casualties, but they tended to be less effective and had more limited operational lives.

After the 1960s, landmines became easier to obtain, and their rate of usage increased. The Tatmadaw was able to obtain supplies of AP and (probably) anti-vehicle (AV) mines from its own arms factories, established with German assistance during the 1960s and 1970s. After the military coup, led by General Ne Win in 1962, Myanmar still received modest shipments of munitions from friendly countries like the USA. These almost certainly included supplies of landmines.

Around the same time, China increased its supply of arms (including landmines) to the Communist Party of Burma (CPB) guerrillas on Myanmar's northeastern border. Other insurgent groups were able to purchase landmines on the black market in Thailand, and reportedly from members of the Thai armed forces and police. The insurgents financed these deals by selling precious stones, jade and narcotics, or by taxing cross-border trade.

Myanmar's two paramount intelligence agencies, the Office of Strategic Studies (OSS) and the Directorate of Defence Services Intelligence (DDSI), claim that landmines are no longer being used by the Myanmar Army as there is no need for them.

The Myanmar government's website seeks to portray the civil war as a thing of the past, stressing that many of the armed insurgencies have collapsed or that they have entered into a cease-fire agreement with the central government. While the CPB did collapse in 1989, and notorious drug lord Khun Sa and his Mong Tai Army (MTA) surrendered in 1996, other armed groups have yet to secure more than a verbally agreed and tenuous cease-fire. Like the Mon National Army, they keep their arsenals and maintain their right to continue armed struggle if negotiations do not work out.

Other groups like the Karen National Union and its armed wing, the Karen National Liberation Army (KNLA), which have never entered into a cease-fire agreement with Rangoon, are portrayed by the government as weak and marginal with little capacity for military operations.

Despite these official denials, the manufacture and use of AP landmines in Myanmar has grown significantly in recent years. The Tatmadaw appears to be placing increasing reliance on landmines to defeat insurgents. Perhaps capitalising on the greater availability of modern AP mines from a new factory built in central Myanmar with Chinese assistance about two years ago.

Mines are being used extensively against the KNLA in its areas of operation in both Kayah State and the Taninthayi Division, against the Shari State Army (SSA) within Shan State, and against the Karenni Army in Kayan State.

The Na sa ka, a special division of the Tatmadaw engaged in operations along Myanmar's border with Bangladesh, maintains an extensive mine field virtually the entire length of the land frontier. This mine field has claimed numerous civilian and military casualties. Further north, along Myanmar's border with the northeastern states of India, the Tatmadaw has also laid mines as part of its counter-insurgency operations against the Chin National Army

The insurgent groups are also using landmines and IEDs more than before. In particular, the KNLA is relying heavily on them in its operations against the Tatmadaw, prompted in part by the fall of the Karens' fixed bases at Manerplaw and Kawmura in 1995 and the KNLA's subsequent reversion to mobile guerrilla tactics. Landmines also make up for their inferiority in numbers and arms especially since the split in the KNLA (which produced the pro-Rangoon Democratic Karen Buddhist Army in 1994) and the introduction by the junta of a massive military expansion and modernization program.

Methods and Results

Landmines and IEDs have been used by all military forces in Myanmar, for both offensive and defensive purposes. As a general rule, the scarcity of resources has not permitted the mining of large tracts of land but mines have been laid outside the perimeter of both permanent and temporary camps to warn of approaching enemies and to defend against attack. They have been widely used along lines of communication, such as railways, roads and pathways, to hinder the movement of troops and supplies.

Landmines have been used to deny territory to the other side and to prevent the use of routes across the international border. Mines have also been laid to encourage local villagers either to leave particular areas, or to stay away from villages that have already been cleared or destroyed. The latter policy seems to be part of a deliberate and widespread campaign by the Myanmar Army to resettle local populations in an effort to deny insurgent groups food, funds, recruits and intelligence.

As a result of all these developments Myanmar has suffered a large number of casualties from landmines over the years. Reliable statistics are difficult to obtain but, according to the U.S. State Department, in the early 1990s casualties from landmines were thought to account for about 15percent of all military losses in Myanmar.

Combatants have not been the only ones killed or maimed. So have many local villagers, particularly in the border areas where the fighting has lasted longer and usually been the most vicious. In 1993 it was estimated that each year in Myanmar over 1,500 people were fitted with artificial limbs as a result of landmine explosions. Many more never received any attention. This number has declined since the negotiation of cease-fires among most insurgent groups, but casualties from landmines remain high. According to an official based in Rangoon, most landmine victims now come from Karen State.

Greatly exacerbating this problem has been the poor management of the mine fields laid. Both the Myanmar Army and various insurgent groups have failed to keep accurate or comprehensive records of where

AP landmines manufactured by Myanmar's Defense Products Industries. On the extreme left is an MM 1 (PRC Type 59 copy) and in the center is an MM 2 (PRC Type 58 copy). The MM 2 is flanked by the LTM 76 stake/fragmentation mine. *c/o Jane's Intelligence*

Map c/o Jane's Intelligence

JOURNAL: The Journal of Mine Action Issue 5.1

mines have been placed. Local villagers are often not informed of their whereabouts for security reasons. During the fall of the KNLA's base at Manerplaw, for example, the militant All Burma Students Democratic Front revealed that all casualties resulted from their own defensive mine field, not enemy fire. Even government soldiers often do not know where their mines have been laid.

Proper maps are rarely produced and often, when a military unit leaves an area, precise details about the local mine fields are not passed on. Even when this does occur, the smaller plastic mines now used by the Myanmar Army can be washed away during heavy rainfall to new, unknown locations.

Field surgery is carried out on a mine victim in Kayah State by the Backpack Health Worker Team, an ethnic-based emergency medical non-governmental organization based on the border of Myanmar and Thailand.
c/o Jane's Intelligence

One saving grace in the past was that the landmines used were made of metal and were liable to rust, rendering them inoperable after one or two rainy seasons. The batteries required for detonation by some insurgent mines rarely lasted more than six months. Also, the wooden stakes used to set up some kinds of AP fragmentation mines had a relatively short life in areas where the climate was hot and wet. According to one government source, some mines used by the Myanmar Army during the 1960s and 1970s became unserviceable because the explosive charge tended to be eaten by ants.

The more modern mines now being used by the Rangoon regime, however, have much longer lives. They are made from more durable materials, do not rely on batteries and remain serviceable much longer after being laid. Also, it appears that, where possible, stake AP mines are being placed on metal spikes so they remain effective for longer periods. Plastic lightweight mines are also being used by insurgent groups—mainly Chinese Type 72 AP blast mines and U.S.-made M-14 mines (or copies of the M-14 from Vietnam and Singapore).

Mines Used in Myanmar

A wide range of landmines appear to have been used in Myanmar over the years. Details are hard to obtain, but it would appear that before 1988 the Myanmar Army had access to common Eastern bloc AP mines such as the POMZ-2 and POMZ-2M stake-mounted AP fragmentation mines. It is highly likely that Myanmar also imported (or was given as part of military aid packages) a range of other AP and AV land mines. These would have probably come from countries like the United Kingdom, United States, the Soviet Union and Yugoslavia, all of which provided arms to Myanmar at one time or another. For example, it is believed that the Myanmar Army was familiar with U.S.-manufactured M-18 Claymore mines, M-16 bounding fragmentation mines, M-14 AP blast mines and M-7 AV mines. It is also believed that Yugoslavia provided AV mines to Myanmar in the 1950s and possibly the 1960s.

During this period the insurgents bought U.S., Soviet and Chinese mines on the black market or, as in the case of the CPB, were directly supplied by China. The latter shipments appear to have included large quantities of Type 58 AP blast mines. This is a direct copy of the Russian PMN mine. The Chinese probably also supplied the CPB with their own versions of the POMZ-2 and POMZ-2M stake mines, known as the Type 58 and Type *59* respectively. There has been at least one report of a Chinese Type 59 "shoebox" AP mine (a copy of the Russian PMD-6 mine) also being used.

Since the Myanmar armed forces took back direct control of the country in 1988, the Rangoon regime (known initially as the State Law and Order Restoration Council, and after 1997 as the State Peace and Development Council) has faced an arms embargo at the hands of its traditional suppliers. As a consequence, it has been forced to rely on a much wider range of sources for its arms and military equipment.

Most mines have come from China, but Singapore, Pakistan, Israel, Russia, Poland, Yugoslavia, the Democratic People's Republic of Korea (DPRK) and Portugal are also known to have sold arms or ammunition to Myanmar's military regime over the past 12 wars. China and Singapore are the most likely

NON-STATE ACTORS IN MYANMAR

Political organization	Armed wing	Ceasefire?	AP mine user?	Producer?	Stockpile?	Mines in territory?
Arakan State						
Arakan Liberation Party	Arakan Liberation Army	No	?	?	?	Yes
Arakan Army of Arakan Land (eke NUPA)	Arakan Army	No	Likely	Likely	Likely	Yes
Rohingya Solidarity Organization	Rohingya Army	No	Yes	?	Yes	Yes
Democratic Party Arakan (former NUFA)	Arakan Peoples Army	No	?	?	?	Yes
Arakan Pohingys National Organization	Pohingya National Army	No	Command detonated	No	Yes	Yes
Chin State						
Chin National Front	Chin National Army	No	Command detonated	Claim no	Yes	Yes
Sagaing Division						
Kuki National Front	Kuki National Army	No	?	?	?	Likely
National Socialist Council of Nagaland (Khaplang)	National Socialist Council of Nagaland	?	?	Likely	Likely	Likely
Zomi National Front	Zomi National Army	No	?	?	?	Likely
Kachin State						
Kachin Independence Organization	Kachin Independency Army	Yes	Not currently	Former	Likely	Yes
(former KIA 4th Brigade)	Kachin Democratic Army	Yes	?	?	?	?
(former CPB 101)	New Democratic Army	Yes	?	?	?	?
Shan State						
Restoration Council of Shan State (alliance SURA, former MTA)	Shan State Army	No	Command detonated	Claim no	Yes	Yes
United Wa Organisation	United Wa State Army	Yes	Likely	Former	?	Yes
Shan State Nationalities People's Liberation Organization	Shan State Nationalities Peoples Liberation Organization	Yes	?	?	?	Yes
Palaung People's Liberation Organisation	Palaung State Liberation Army	Yes	?	?	?	Yes
Wa National Organisation	Wa National Army	No	?	?	?	Yes
(former CPB 815)	National Democratic Alliance Army	Yes	?	?	?	Yes
Karenni State						
(former CPB ally)	Karenni National People's Liberation Forces	Yes	Likely	Likely	Likely	Yes
Karenni National Progressive Party	Karenni Army	Broken	Yes	Yes	Likely	Yes
Karenni National Democratic Front	Karenni National Democratic Army	Yes	Likely	Likely	Likely	Yes
Karen State						
Karen National Union	Karen National Liberation Army	No	Yes	Yes	Yes	Yes
Democratic Karen Buddhist Organisation	Democratic Karen Buddhist Army	No	Yes	Likely	Yes	Yes
All Burma Students Democratic Front	All Burma Students Democratic Front	No	Likely	Likely	Yes	
All Burma Muslim Union	All Burma Muslim Union	No	?	?	?	Yes
People's Defense Forces	People's Defense Forces	No	Command detonated	Claim no	Yes	Yes
People's Liberation Front	People's Liberation Front	No	?	?	?	Yes
Mon State						
New Mon State Party	Mon National Liberation Army	Yes	Former	Former	Yes	Yes
Pegu Division						
Karen National Union	Karen National Liberation Army	No	Yes	Yes	Yes	Yes
Tenasserim Division						
Myeik-Dawei United Front	Myolk-Dawel United Front	No	Command detonated	?	Yes	Yes
Karen National Union	Karen National Liberation Army	No	Yes	Yes	Yes	Yes
All Burma Students Democratic Front	All Burma Students Democratic Front	No	Command detonated	Yes	Yes	
[KNU break-away]	God's Army	No	Yes	?	Yes	Yes

Notes for non-state actors chart:
Ceasefire: Has verbally negotiated ceasefire agreement with SLOPC or SPDC (no written agreements exist).
AP mine user: Is currently practicing mine warfare, either defensively or offensively.
Producer: Manufactures improvised explosive devices which have the characteristic of an anti-personnel landmine, or alter other munitions to serve as anti-personnel landmines.
Stockpile: Maintains a store of mines, or components, for use in warfare,
Mines in territory: Mines now in-the-ground in their province or division of activity, Could be laid by themselves, allies or adversaries,

There is a variety of small, self-proclaimed armed groups that are dysfunctional or not currently active that are not included. Revolutionary political organizations, which do not maintain an armed wing, are not included. Some of these armed organizations are primarily involved in the narcotics trade for self-perpetuation rather than any real political activity. Several armed groups are quite small and work only in alliance with other groups.

Chart c/o Jane's Intelligence

of these countries to have included landmines in their arms shipments to Myanmar.

There is evidence that since 1989, when the BCP collapsed and bilateral relations with China rapidly improved, Beijing has supplied Myanmar with AP landmines. In addition to those types noted above. One source in Rangoon has suggested that these shipments have included the Type 69 Chinese AP bounding fragmentation mine, similar to the US-made M-16, popularly known as the "Bouncing Betty." Both U.S. and Chinese mines of this type have been used in recent operations by the Tatmadaw in the Taninthayi Division. The Chinese Type 72 AP blast mine has also been used against insurgents in recent years, as well as an (as yet unidentified) Italian-designed AP blast mine. Mines manufactured by Singapore and Israel are also reported to have been used in Myanmar, but this has not yet been confirmed.

The military regime in Rangoon, however, has never been comfortable relying on foreign countries for its military supplies. Since the mid-1950s it has built up a network of its own defence industries, capable of producing a range of arms and ammunition, including landmines. There is evidence that this capability has recently been increased.

Mine Manufacture

For some years before 1988 Myanmar had been able to produce its own landmines at a German-built factory in the regime's heavily guarded defence industrial complex on the western side of the Taninthavi (Irrawaddy) River, near Pyay. Most appear to have been copies of proven Eastern bloc stake and pressure AP mines, known locally as lu-that (AP) mines, but some AV mines were probably also produced.

About two years ago, however, a secret agreement was reportedly signed with China for the construction of a completely new factory near Meikhtila in central Myanmar, solely to produce landmines. Although sources disagree on the progress made on the factory since then, it seems that serial production of some mine types has begun.

From the limited information available, this factory is believed to produce at least five types of mines, designated MM-1 through to MM-5. The MM-1 is essentially the Chinese Type 59 AP stake-mounted mine, with slight modifications to the detonator and weather cap. The MM-2 design closely follows that of China's Type 58 AP blast mine. Two variants of the MM-2 have been confirmed. The characteristics of the MM-3, MM-4 and MM-5 landmines are still unknown, although it is possible that one is an AV mine.

Myanmar produces a shi-twe directional mine, possibly a copy of the M-18 Claymore, which may have been given a 'MM' designation. Following the practice adopted by Myanmar's defence Industries in the past, these designations probably mean Myanmar Mine 1, Myanmar Mine 2 and so on.

Most informed Myanmar watchers believe that China is still providing technical assistance and spare parts for the Meikhtila factory, as well as some of the key components used in the manufacture of these mines. Singapore (which manufactures its own range of plastic-bodied AP and AV mines, including some under licence) may have assisted in the establishment and operation of this plant. Singapore is secretly assisting Myanmar in other areas of arms manufacture, such as the production of a new family of infantry weapons. Claims that it is helping to produce landmines in Myanmar cannot be proved.

Most insurgent groups maintained workshops in which to repair and manufacture weapons, including landmines. After the collapse of the BCP in 1989, Khun Sa probably had the greatest capacity of all Myanmar's insurgent groups and narcotics-based armies to manufacture and lay landmines. When he surrendered in 1996 the Myanmar Army took possession of, and reportedly destroyed, over 2,000 landmines that had been stored at his Ho Mong base camp. Most appear to have been AP mines, but Khun Sa also had a stock of large AV mines that he claimed was to protect his camp from "external aggression."

It is not known what specific kinds of mines were being manufactured or held in the MTA's inventory, but they are most likely to have been copies of the simpler, locally produced AP mines, like the POMZ-2M.

Other insurgent groups have not had the funds, expertise or facilities to make landmines of this kind, or on this scale. Most have tended to rely on booby-traps and other IEDs. Explosives from quarries in Myanmar or neighboring states have been obtained and placed in any available container-usually plastic pipes or bamboo links. Sometimes glass bottles have been used as glass readily lends itself to fragmentation. Metal waste and nails have been added as shrapnel to make the mine even more destructive.

Electric detonators were obtained from the same quarries. Trip plates were made of wood and wire, and were linked to a common dry cell battery. These improvised mines are quite effective but usually have a limited life, often no more than six months, as the batteries tend to run out after that time.

Insurgent groups like the Karen reportedly feel that their limited funds are better used to buy guns and ammunition, rather than components for landmines. Because of the current shortage of resources, they try to dig up and take their landmines with them when they move.

Such is the demand for landmines in Myanmar that all stocks produced have been used in-country There have been no reports of the Rangoon regime or insurgent group exporting landmines to another country or group.

Laying, Detection and Clearing

The Myanmar armed forces rely mainly on traditional methods to lay mines—by hand. The army's Engineering Corps reportedly has some towed mine-laying vehicles when large areas are to be mined, but the difficult terrain in the insurgent areas of operation would restrict their effectiveness.

Over the years, Myanmar Army engineers have used a variety of means to detect and clear mines. Manual methods, mainly using probes, have been most common. Since the early 1970s, however, a greater reliance has been placed on the use of mechanical mine detectors. In the past, these have included French DHPM-1A mine detection sets, White's Electronics 6000 Di-PRO SL detectors from the UK and UK-made NMD-9 equipment. There have also been reports that Myanmar manufactures its own mine detector, known as the Tha-ma 93. This detector, which consists of a circular search head, carrying handle, battery-powered control box and a set of attached headphones, seems to be a copy, or maybe a modification, of an imported device.

The Myanmar Army has Bangalore torpedoes, which can be used to clear pathways through mine fields, and has also used mine detecting and detonating vehicles. These range from a jeep pushing a weighted trailer to set off the mines in its path, and a tank-mounted mine roller designed to do the same thing, to a specially designed mine clearance plough. The latter seems simply to be a small tank with a bulldozer blade on the front of the vehicle. It is not known how many of these vehicles are in the Myanmar Army's order of battle, how or from where they were acquired. It is possible that some of these vehicles have been built by the Myanmar Army itself, with designs based on well-known models for sale on the international market. The nature of the terrain around Myanmar's borders, however, would restrict the use of such machines.

The Tatmadaw has seriously considered the use of sniffer dogs to detect mines, but how often this method has been used, and with what degree of success is unknown.

There have also been numerous confirmed reports of the Myanmar Army using local villagers and forced laborers as human minesweepers. These people (including women and children) have been forced to walk ahead of military units, detonating any landmines or booby traps that lie in their path.

Indiscriminate Use

At present there is no sign that the Rangoon regime intends to reduce its manufacture or use of landmines in Myanmar. Indeed, the opposite is true, with the increased use of AP mines against insurgents by the armed forces being fuelled by a new munitions factory and imports from friendly countries like China. In these circumstances, it is not surprising that the military government has consistently refused to sign the 1997 Mine Ban Treaty, stating to the U.N. that "a sweeping ban on landmines is unnecessary and unjustified."

The problem is the indiscriminate use of mines, as well as the transfer of them. The opposition National League for Democracy, in contrast, has publicly stated that it would be prepared to support Myanmar's accession to the Ottawa Convention. At present, however, its activities (and those of its leader, Aung San Suu Kyi) have been severely curtailed by the regime and it has no scope to implement such a policy.

The continuing manufacture and indiscriminate use of AP mines by the Myanmar armed forces seems set to continue. The insurgents, for their part, will also use mines and explosive booby traps in their struggle against the central government, made from whatever resources they can obtain. The inevitable result will be further casualties, as combatants and civilians alike are killed and maimed by these weapons in a part of the world that has not known peace for over 60 years. ■

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Vietnamese Ministry
Tours U.S. Following Historic Agreement

Delegation of Vietnamese demining experts visits James Madison University's Mine Action Information Center as part of State Department-sponsored U.S. tour. Visit follows the United States's provision of $3 million in landmine aid to Vietnam.

Deputy Commander Quang Khanh (second from right) is greeted by JMU professor Helmut Kraenzle (far right). *c/o MAIC*

by Keith Feigenbaum, *MAIC*

A five-man delegation of Vietnamese humanitarian demining experts recently toured the United States to gain an appreciation of the American view of humanitarian demining concepts and operations.

The U.S. Department of State-sponsored visit with the Vietnam Ministry of Defense included meetings with top officials in the State Department and the U.S. Department of Defense. The trip was highlighted by visits to training sites, corporations involved in mine action, and the Defense Security Cooperation Agency (DSCA)-sponsored MAIC.

The arrival of the Vietnamese Ministry of Defense followed close on the heels of the signing of a historic agreement that will provide Vietnam with over $3 million (U.S.) in landmine assistance in the coming years.

After visiting the U.S. Army's Humanitarian Demining Research & Development Center in Fort Belvoir, Va., and leading U.S. demining organizations in the Washington D.C. region, the delegation made its way to JMU for briefings organized by the MAIC. The Vietnamese delegation was led on a campus-wide tour of JMU and was briefed by U.S. and MAIC officials on demining information management. The MAIC also provided the results of its mine awareness campaign in Vietnam's Quang Tri province (site of the former DMZ).

Although the Vietnamese defense officials were concerned primarily with mine clearance activities, they showed special interest in the MAIC's efforts to help the local populace in Quang Tri province spot and avoid mined areas. The delegation, led by Truong Quang Khanh, deputy commander of Vietnam's Ministry of National Defense, was addressed by JMU professors Anne Stewart and Terry Wessel, who ran the mine awareness program from October 1998 – March 2000.

Tom Smith, DSCA program manager for humanitarian assistance and demining programs, outlined the program management role his office will play in shaping the emerging U.S.-Vietnam landmine project.

About the visit to the MAIC, a State Department humanitarian demining officer remarked, "The visit to JMU was great. It shows that [the United States] can do more than just provide equipment and gear to the Vietnamese mine action effort."

The visit came just months after the United States and Vietnam signed a historic bilateral agreement that will allow the Vietnamese to receive modern demining equipment and other mine-related assistance through the U.S. Humanitarian Demining Program. The Vietnamese will receive $1.75 million worth of demining gear under the June 2000 agreement to aid in the removal of the estimated 3.5 million mines, as well as vast amounts of UXO that contaminates its countryside and snarles its infrastructure.

The State Department also plans to provide $1.4 million to conduct a Level One impact survey which will help the Vietnamese to prioritize those areas which pose the greatest immediate threat to civilians, arable land and infrastructure. The DoD will target $200,000 for technical mapping of those selected sites, and $80,000 for mine awareness education and landmine database support.

Following its tour of the MAIC, the delegation visited mine action-related facilities at the Global Training Academy in Somerset, Texas, the Humanitarian Demining Training Center at Ft. Leonard Wood, Mo., and the U.S. Pacific Command (PACOM) and Asia-Pacific Network in Hawaii. ■

GERBERA: Mine Action
Activities in Vietnam and Laos

In an attempt to help Vietnamese villagers resettle their UXO-contaminated homeland, Germany's GERBERA took the clearance initiative in 1998. As of July 2000, it had successfully relocated 40 families and expanded operations to Laos.

By Lisa M. Vanada, *MAIC*

Overview of GERBERA

The GERBERA demining organization was founded in 1994 to provide three main services: EOD activities in Germany, where the organization is based; international EOD and demining assistance; and local and international special engineer services, which include the surveillance and cleanup of any kind of environmental waste. Although GERBERA often cooperates with humanitarian associations and local governments, it is equipped to deal with every facet of a mine clearance project.

Quang Tri province demining team. *c/o GERBERA*

Resettlement and Relocation in Vietnam

Over 25 years ago, villagers in the Quang Tri province of Vietnam were evacuated during the Vietnam War. These villagers abandoned their farms and homes for a military base situated in a nearby river valley. However, this situation was far from optimal because the river floods twice a year, limiting the agricultural success of the evacuees. In spite of the poor farming conditions, the villagers remained on the base; UXO contamination prevented them from returning to their homelands. A German NGO based in Berlin recognized the need for a resettlement program and began the process of preparing the land for the villagers' return. In May of 1998, GERBERA began mapping the two villages in the districts of Cam Lo and Ai Tu. After methodically clearing 171 hectares of over 5,000 UXO, the villagers were finally allowed to return to their lands.

In an attempt to escape the UXO contamination of their land, villagers in Vietnam's Hue province migrated south to the Cau Hai lagoon. Approximately 5,000 peasants currently live on boats and attempt to make their living fishing in the overcrowded lagoon. The area is overpopulated and the constant fishing has expended the natural resources. The fish they catch are pathetically small; the biggest are only 5 cm long and most of the local wildlife was displaced. Vogt explains the situation as "not only a social problem, but an environmental one." In 1999, GERBERA began surveying land designated for the relocation of the lagoon residents. It began removing UXO in July 2000 and has presently cleared enough land for 40 families.

Family boat in Cau'Hai Lagoon. *c/o GERBERA*

Potsdam Kommunkation, the German NGO heading the relocation project, hopes that a stable village existence will allow families to send their children to school for the first time. In the past, many of the families traveled seasonally to follow the fish and the shrimp migration. Relocated families are given land where they can build homes and cultivate small farms. By working the land and earning a stable living they will be able to build a community with neighbors and village support.

"GERBERA has a training advantage: Germany requires all civilian workers in EOD companies to complete an EOD training school in Dressen. All employees must receive their licenses from this school, and Vogt describes this license as a 'higher degree' for EOD workers."

Equipment and Clearance

In addition to the resettlement and relocation projects in Vietnam, GERBERA is involved with UXO clearance in Laos. Since September 1996, it has destroyed over 34,000 UXO in the Luang Prabang province. GERBERA has not used heavy mine clearing machinery in its Southeast Asian projects for two primary reasons: terrain and money. Heavy machinery is rarely used in Vietnam or Laos because of the muddy terrain and heavy forests, Vogt clarified this decision as one based on convenience and environmental concern. "You can't use heavy machines if you destroy everything you want to preserve in the area," he said. Paddy fields, for example, are enclosed with small dams to retain the water. Because the average field is only 40 by 50 meters, large mine detection or clearance machinery taken through the area would destroy the dam and most of the field itself.

The expense of the equipment also negates practicality. GERBERA tested a computerized detection program in Laos; the same program has been used successfully in Germany. Although this technology is feasible in a stable economic environment with high wages, the relatively low wages in the developing countries in Southeast Asia make expensive technology an unlikely option from a financial management perspective. Mine clearance organizations usually find it more efficient to hire a larger number of clearance workers than to use expensive computerized systems. Local workers are readily available, relatively inexpensive to hire, and welcome the opportunity to supplement their income and participate in clearance activities that increase the safety of their families and villages.

Although few mines are found in Vietnam, several types of UXO, primarily different types of bomblets and rifle grenades, contaminate the countryside. The M-16 rifles used in the war held a small device used to launch 40-mm grenades. These rifle grenades litter the region and present a constant threat. Because the grenades were intended to explode shortly after they were launched, the fuses are very sensitive. Vegetation often partially or fully conceals these grenades, which have caused more fatal injuries after the war than any other types of UXO.

Due to the terrain, expense and type of UXO contamination, GERBERA uses handheld metal detectors to locate UXO positions and depths. This simple technology is reliable and well-suited to the project. After using the metal detectors to scan a plotted area, a detailed map is drawn up for use in clearance and disposal. According to Vogt, clearing the mines is the most difficult step in their work. Project supervisors personally inspect each UXO to analyze the type, location, and other factors that determine if it is possible to move the UXO. If it can be moved, the workers carefully transport the UXO to a designated demolition site. Most of the mines GERBERA has encountered are very old and sensitive. If mines are too unstable to transport, they are destroyed in situ.

GERBERA often asks village religious leaders for the best dates and times for major project events, such as the opening of a project or the introduction of a new building. This approach shows consideration for the village's cultural traditions.

Quality Assurance

GERBERA places a great deal of emphasis on the importance of quality assurance. Unlike some demining organizations, who respond to a community request to remove a particular UXO or clear a specific area, GERBERA's activities in Southeast Asia require large tracts of land to be entirely clear of UXO and prepared for human inhabitants. To ensure that the designated land is completely mine-free, GERBERA usually relies on two forms of quality assurance: internal quality control and external quality control. Because Vietnam and Laos do not place external quality controls, GERBERA's internal system has been revised to provide several levels of clearance checks.

Clearance worker in Quang Tri. *c/o GERBERA*

A typical mine clearance team consists of several workers who are given daily assignments of UXO-contaminated zones. Their goal is to clear the entire area of any mines, UXO or metal objects that could cause a metal detector to sound its alarm. At the end of each day, team commanders canvas between 20-50 percent of the area their team has cleared that day. He checks the area without any consistent system, so the clearance workers are never certain which portions of their area or the adjoining areas will be inspected. The commander should be able to navigate throughout the cleared areas without hearing a single beep from the mine detector. Any detected items are removed immediately and the commander restarts the inspection.

Because this quality assurance system relies heavily upon the functionality of the metal detectors, these handheld devices are frequently checked. Commanders test their equipment every morning and after every break to make sure that it is working properly. In addition to daily inspections of metal detectors, GERBERA designed a system requiring each project to create and use a test field. The test field begins as a completely cleared piece of land; any objects or minerals that will cause the mine detectors to signal are removed. Next they carefully map and create defined signal sites where metal pieces are inserted at different predetermined depths. All metal detectors must complete these test fields on a weekly basis, and every detector is graded for the detection accuracy of every signal site.

This consistent test for detection and depth allows the handlers to notice slight changes, as the grades are compared for any alterations. Frequent evaluation of tests and results allows workers to determine even slight technical aberrations. Vogt explains the importance of this early detection. "It's very easy to realize if a technical instrument breaks down completely," he says, "but very often it's not a sudden breakdown but [it] goes slowly. It's a process. By using this test field, we can realize very early if such a weakness occurs."

Training

As a German-based organization, GERBERA has a training advantage: Germany requires all civilian workers in EOD companies to complete an EOD training school in Dressen. All employees must receive their licenses from their school, and Vogt describes this license as a "higher degree" for EOD workers. Even officers of the Germany military, regardless of rank and professional experience, are not permitted to participate in EOD work

without obtaining this license. GERBERA uses the material from this German EOD school to train local workers they hire for specific projects. The training the workers receive depends on the tasks they will be assigned and the requirements of the local government.

In Laos, all workers complete basic UXO and landmine training in UXO-Lao's National Training School based in Vientiane.

The United States founded this school. Special Forces teams from the Pacific Forces train the local deminers.

GERBERA training group. *c/o GERBERA*

GERBERA also provides training for specific project assignments and tasks; this specialized training often includes regional Standard Operating Procedures (SOPs) and an introduction to the culture. The task has been simplified over the years through standardization. When the demining activities began, every organization had its own SOPs that GERBERA contractors needed to learn. Eventually SOPs were standardized, and they are currently unified for Laos.

In Vietnam, the training system must accommodate the Vietnamese government's regulations. Only the higher-ranking officers are permitted to receive the advanced training, but basic training is provided daily for the lower-ranking Vietnamese officers and soldiers. Basic training includes instructions for removing the normal technology, the difference in the technology between mine clearance and UXO clearance, safety procedures, technical procedures, requirements for quality control inspections, and standard GERBERA rules and regulations. The high-ranking officers receive special training on fuses, ammunition and demolition work, equipment handling and maintenance, and technical details for repair work.

Cultural Respect

Interactions between the villagers and the professional deminers are frequent and can be helpful, as the villagers often provide crucial information on UXO locations and terrain. In return, the experts establish mine awareness education programs and attempt to accommodate local customs. GERBERA professionals are taught to respect the cultural and religious traditions upheld by the countries in which they work. Vogt related an event that illustrates the importance of respectfulexchanges, particularly when cultural or religious infractions are unknowingly made.

At the end of a workday in a remote village in Laos, a GERBERA team prepared to destroy the collected munitions. The team leader visited all the houses in the village to advise the residents that they should leave. At one of the houses, he called out to ask if anyone was home. Hearing a muted voice from inside the house, he stepped over the flowers at the door to enter the home and asked the woman inside to leave before they detonated the munitions. He returned to the project site unaware that the flowers at the entrance of the home signified that an occupant had died. Custom prohibits anyone except the wife of the dead husband from entering the house.

After the detonation, the team prepared to leave the village but was stopped by the shaman. He told them the unwelcome visitor had disturbed the ghosts. To appease the ghosts they must perform a very expensive ceremony, and the whole team must remain in the village for three days. After a lengthy dispute the German commander paid the equivalent of two dollars, the villagers were satisfied, and the team was allowed to leave.

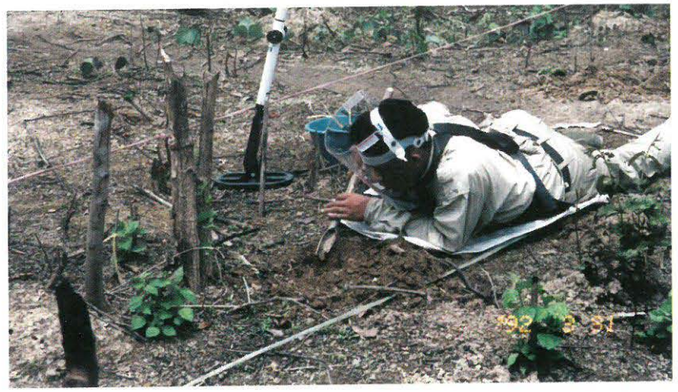
Vogt stressed that the most important aspect of this transaction was respect. He explained, "If you negotiate with the peasants you have to respect their feelings and their traditions. It was impossible simply to leave." Several GERBERA policies reflect the value it places on respectful exchanges.

Expanding Mine Awareness

A complete GERBERA project task force includes a community awareness team. For the project in Laos, the team members attended UXO Lao classes on mine awareness and safety education. Although some of the members are already teachers, they are all taught basic teaching skills and methods for increasing mine awareness. Team members are taught to accompany their teaching sessions with diagrams, pictures, illustrations and puppet shows targeted at children.

In Laos, the GERBERA Community Awareness Team found it necessary to teach adults and children alike not to make an open fire in the woods without first checking the soil. After the occurrence of several different incidents involving villagers who died cultivating new farmland, the team incorporated lessons teaching the villagers not to cultivate new land before the area is cleared.

Mine education in Vietnam is conducted with the cooperation of the schools. The GERBERA Community Awareness Team contacts teachers to schedule mine education sessions. Team members frequently revise sessions to incorporate information pertinent to local situations or perspectives. Shortly after GERBERA arrived in Vietnam, the Community Awareness Team developed an educational program to address the dangers of scrap metal collecting. Many Vietnamese men gathered grenades and UXO to sell as scrap metal, but often their crude digging tools and inexperience led to injuries and death. The teaching sessions were most successful when they focused on educating the women and children. The women could often persuade their husbands and sons to stop recovering scrap metal.



A deminer uses a hand tool to deal with vegetation. *c/o GERBERA*

Continued Diligence

Vogt emphasized that the adherence to structured project assessments, quality control regulations, equipment assessments and promotion of mine education and awareness is not limited to the projects in Laos and Vietnam. GERBERA personnel are required to complete advanced training in services ranging from mine detection, mapping, and mine neutralization and clearance, to mine awareness education and local training. Because they offer a wide range of skills and knowledge, GERBERA personnel are often called upon to provide specific assistance for international demining programs, in addition to entire project assignments. As long as humanitarian organizations and local and international governments and associations continue to acknowledge and address mine contamination problems, GERBERA plans to continue their mine action and their efforts to cleanse the environment. ■

The munitions pictured are typical of those littered throughout Vitenam's Quang Tri province. c/o GERBERA

Much of the content for this article has been gathered from an interview with Lutz Vogt, the General Manager for GERBERA. Vogt is responsible for GERBERA's demining and UXO clearance activities and has participated in the projects described in this article.

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The U.S. Humanitarian Demining Program:
Engagement in Vietnam, Laos, Cambodia and Thailand

The Humanitarian Demining Program is working with U.S. government agencies and NGOs to provide mine awareness training, mine clearance, clearance training, medical services and the latest in demining technology to mine-affected nations.

by Kela Morehead, *U.S. State Department Fellow*

The U.S. Humanitarian Demining Program (USHDP) seeks to relieve human suffering while promoting U.S. interests. The program's objectives are to establish and support sustainable indigenous demining programs, reduce civilian casualties, create conditions for the return of refugees and displaced persons to their homes, reinforce the stability of affected countries, and encourage international cooperation and participation. USHDP is a comprehensive effort supporting mine action initiatives including: mine awareness, the clearance of priority land, training host country deminers, reviewing and accelerating promising technologies, and medical and rehabilitative assistance to survivors of landmine accidents.[1]

On Sept. 13, 1993, the National Security Council established an Interagency Working Group (IWG) on landmines and demining. The implementation of this directive resulted in the establishment of core concepts for the USHDP. The IWG on Humanitarian Demining is charged with identifying which countries receive U.S. demining assistance and managing U.S. resources committed to the program.

The United States seeks to tailor each program to the needs of each nation and often works in cooperation with international agencies and host governments of mine-affected states all over the world. The United States supports mine clearance operations and mine awareness programs by providing training, expertise and equipment support through programs of the U.S. Department of Defense. Support also comes from funding, training and operations provided by commercial organizations or NGOs. In countries where a direct U.S. military training mission is not necessary, the United States contributes to programs administered by the United Nations, the Organization of American States, or the U.S. Agency of International Development (USAID).

A mine-affected country in need of aid can request United States assistance via the U.S. embassy in that country. The embassy reviews the request and forwards it to the IWA on Humanitarian Demining in Washington D.C. The IWA is responsible for approving, developing and coordinating U.S. humanitarian demining policy and programs. Its members include policy and technical experts from several government agencies.

The IWG is chaired by the U.S. Department of State and vice-chaired by the Department of Defense. Other members include the National Security Council, USAID and the Central Intelligence Agency (CIA). To date, the United States has assisted 37 different country programs around the world, including demining efforts in Kosovo and Somaliland. The United States has contributed nearly a half a billion dollars to the eradication of landmines.

U.S. Activities in Asia

There are 16 mine-affected nations in Asia.[2] The United States currently has four programs within South Asia: Cambodia, Thailand, Laos and, most recently, Vietnam. Most of these South Asian demining programs have been established within the past five years, but are already saving lives and improving what could be considered dangerous living conditions. Southeast Asia has an extensive UXO and landmine problem that the United States is committed to eradicating.

VIETNAM

The United States has supported the NGOs presence in Vietnam for many years, building the framework for improved U.S.-Vietnam relations. A formal demining program for Vietnam was approved in June 2000, allowing greater U.S. assistance and further demining initiatives. USAID alone has provided Vietnam with over $5 million (U.S.) used for various initiatives in order to assist with the development of Vietnamese programs and insuring the economic stability and indigenous support for the programs created.

U.S. Nonproliferation, Anti-terrorism, Demining and Related Programs (NADR) funds were allocated in 1998 and 1999 to Vietnam for the establishment of a mine awareness and training center. The MAIC at JMU was chartered by the State Department Humanitarian Demining Program Office in 1999 to develop a mine awareness program in Vietnam. The goals of the program were to develop mine awareness education knowledge, teach requisite management skills, and implement a rudimentary mine awareness campaign with the government and the people of Quang Tri province, Vietnam.

The mine awareness program operations were developed in accordance with Vietnam's National Plan for Sustainable Development from 1991 to 2000. The overall goal of the project was to influence the behaviors, perceptions and attitudes of families living in Quang Tri, thus allowing them to escape or minimize the effects of latent unexploded munitions by providing appropriate knowledge and techniques to the children and families of the region. This methodology was selected because it used an iterative building block approach that utilized maximum support of, and ongoing collaboration and cooperation with, the People's Committe officials, the Women's Union and the Committee for the Care and Protection of Children representatives, and the people of the province. To the extent that its goals were achieved, the project was successful because each component activity was conducted within the context of a working partnership with the host nation populace.

In 2000, over $1.7 million was contributed to Vietnam for the start up of a humanitarian demining center, in addition to demining and mine awareness equipment. The United States is also supporting a Level One Survey in Vietnam to record the severity of landmine and UXO infestation, and to better formulate a plan of action. In 2001, the United States plans to allocate more than $2 million to support mine action in Vietnam.

The U.S. government is ready to continue to support the large NGO population present in Vietnam, but is now assisting with the start up of the newly approved U.S.-Vietnamese Humanitarian Demining Program. With more opportunities to help fund landmine/UXO clearance, provide mine awareness and victims' assistance, while building cooperative relationships, Vietnam will soon be along the path to saving lives and healing the wounds caused by past conflict.

JMU staff prepare Women's Union members to conduct a mine action survey. *c/o MAIC*

LAOS

Intense combat from 1964 to 1973 in Laos led to the extreme UXO situation present there today. The primary threat to civilians in Laos is UXO, not AP mines, though both are present. Two million tons of ordnance were dropped on Laos, of which 30 percent is unexploded. Over half of the country is plagued with UXO today. The most contaminated areas are northern provinces like Houaphan and Xieng Khouang and the eastern border, which had been heavily bombed. These weapons continue to kill people more than 25 years after the original conflict.

The United States has been assisting Laos since 1995. Over $14 million has been provided for humanitarian demining projects, mine awareness programs and victims' assistance, via the Department of Defense, State Department and USAID. The United States is the largest contributor to the UXO/ landmine relief in Laos, providing over 25 percent of its total contributions. The United States has had an active role in UXO Lao programs since 1996, and has also been its single largest donor. Funds contributed by the United States maintain mine/UXO awareness in eight provinces, mine/UXO clearance in seven others, and created rapid response teams in the remaining five. In 1996 and 1997, U.S. money helped established UXO Lao and fund training for UXO clearance, community mine awareness and medical care for UXO Lao personnel. The Nam Suang UXO Training Center was also supported by the United States and staffed by Lao instructors. This center

JOURNAL: The Journal of Mine Action Issue 5.1

offers courses in community awareness, clearance techniques, medical training and leadership development. By the end of 1999, U.S. military contingents had trained more than 815 indigenous personnel and created a self-sustaining training capacity. The U.S. trained deminers have destroyed more than 100,000 pieces of UXO and 43 landmines.

Through international donations and support, 300 medical staff personnel have received training in emergency rehabilitation and laboratory services. One provincial and five district hospitals have received medical equipment and supplies. The United States and others within the international humanitarian demining community will continue to support the well-rounded and effective UXO Lao program.

CAMBODIA

Cambodia's landmine and UXO problem was caused by two decades of war. Four million to 6 million landmines on 3,000 km^2 of land compose the threat that 23 Cambodian provinces suffer. There is a minimum of 50 casualties a month attributed to landmines. In addition to the devastating physical and medical problems landmine and UXO accidents cause, socioeconomic ramifications are also increasing. War Child has reported that without this landmine problem "agricultural production could increase …135 percent in Cambodia."[8]

In 1997, the United Nations trained 537 Royal Cambodian Armed Forces (RCAF) engineers resulting in the demining of 800,000 sq. m of viable land along a major highway. Cambodia has received equipment from the U.N. Development Program Trust Fund and over $23 million in NADR funds from the United States. The United States has provided training for 1,200 personnel in basic demining techniques, leadership, medical skills and mine awareness. Mine clearance operations led to the reconstruction of a road and bridge, opening access to a chief city for the first time in 20 years.

Two mines found within a mine clearance lane. *c/o USHDP*

The Cambodian Red Cross Mine Incident Database has been a huge project initiated by the NGOs. The information entered into this database will further help the humanitarian demining cause of Cambodians. Further initiatives by the Rural Planning Committees and the RCAF, with the contributions from the United States led to the establishment of the Cambodian Mine Action Center (CMAC). CMAC, with the help of the United States and other international donors, has reduced the casualty rate from landmines by 90 percent. Still, one in 45 Cambodians is an amputee, presenting a new problem facing this landmine-scourged society.

USAID has invested over $6.8 million in the Cambodia Prosthetics and Rehabilitation Program since 1992. USAID money also goes to support the Disability Action Council and VVAF, to assist landmine victims by expanding rehabilitation and job training programs, and by strengthening the institutions that Cambodian society needs to sustain such programs. These programs have produced and fitted 635 multi-axle feet and 1,300 thermoplastic prostheses and treated 8,000 patients.

CMAC Mine Awareness class in session. *c/o USHDP*

THAILAND

Thailand's landmine problem is the result of past internal insurgencies, as well as armed conflicts with neighboring countries. There are an estimated 100,000 landmines located along Thailand's borders with Cambodia, Burma, Laos and Malaysia. Those mines are on approximately 900 sq. km of land and affect 18 provinces.

The United States first provided Thailand with a provisional $1.7 million in 1999. The provisional money funded a demining school for mine awareness classes in Lop Buri, a facility for basic demining in Ratchaburi, while also providing essential demining equipment. Since 1999 the United States has provided nearly $5 million to Thailand's humanitarian demining efforts. U.S. Special Forces contingents have trained more than 100 Thai deminers to international standards. Thailand's Mine Action Center (TMAC) was officially dedicated in January 2000 and demining activities actually began later that year in July. TMAC will become a key instrument to further humanitarian demining assistance and mine clearance initiatives in Thailand. Within the past year the U.S. and Thai governments have decided to initiate a Mine Detecting Dog Program. RONCO Consulting Company has been contracted to provide support for the Dog Program in Thailand beginning in 2001. Mine detecting dog programs have been successful in many other countries, increasing mine clearance productivity while also insuring greater safety for both deminers and demining dogs.

Future for Demining

The future for demining efforts looks bright for Southeast Asia. International cooperation, NGO support and U.S. assistance supports productive work within Laos, Cambodia, Thailand and Vietnam. More equipment, funds and mine action is planned for 2001 within each of these countries, saving more lives and eradicating the dangerous evidence of conflicts from the past. The United States plans to assist NGO projects in Cambodia, help provide more equipment and protective gear for demining efforts there, and continue to support (via UNDP) the work done by CMAC. Laos is continuing its demining efforts and the United States will make equipment provisions and support the Lao Trust Fund. Thailand's dog program will have the backing of the United States, while Sa Kaew and HMAU put new demining equipment to positive use. Vietnam has continual NGO demining assistance, but since its approval for a formal demining program support and future demining efforts will accelerate.

The United States has never been more committed to the landmine and UXO scourge in Southeastern Asia. The United States will continue to support the indigenous mine action efforts of countries already receiving U.S assistance, and will review new requests for assistance from neighboring UXO and landmine infested nations. Remarkable successes have been achieved in mature programs like Cambodia and Laos, and the new programs in Thailand and Vietnam. Hopefully, one day in the future, stability and cooperation can reign over the whole Southeast Asia landmine crisis. ■

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Mine clearance project in Cambodia where mine fields are often in the paths of civilians. *c/o USHDP*

The Children's Plight in Cambodia

UNICEF's mine action initiative in Cambodia puts victim assistance, risk education and community awareness at the forefront. Efforts have helped produce a national mine incident database, which aids in planning and evaluating fundraising.

by Chris Horwood, *Team Leader of the External Evaluation,* and Michel Le Pechoux, *Children Affected by Armed Conflict Project Officer, UNICEF Cambodia*

A Sobering Context

Mine action agencies in Cambodia continue to face a major challenge. In the past decade they have only been able to partially address the vast mines and UXO problem. This article seeks to show that despite this sobering context there are positive and important lessons to be learned from the Cambodian experience that need to be shared with the global mine action community as models for progress. Specifically, this article represents some lessons learned from UNICEF's mine action involvement in Cambodia, as highlighted in a recent external evaluation conducted for UNICEF.

UNICEF Gets Involved

UNICEF Cambodia first started assisting mine victims as part of its support to disabled persons in 1992. Direct support of mine action activities began in 1994 and has increased over the years toward the present more comprehensive multi-action support. UNICEF is now involved in a range of programs in the field of mine action, victim assistance and provision of basic social services, as well as community development in mine-affected communities.

UNICEF Cambodia is unusual in that it has been closely involved with mine action initiatives beyond its usual role of mine awareness in other countries (1). To assess its progress to date and as a guide for future direction, UNICEF commissioned an external evaluation in mid-2000 to assess activities supported for the prevention of mine/UXO accidents. A selective summary of the external evaluation (2), containing important lessons for other country programs are presented below. However, to put these findings in context, the more sobering overview of mine action in Cambodia should be presented.

Official Mine Action

Cambodia is considered to have one of the longest running and most comprehensive mine action programs in the world. Over 3,750 people are directly involved in the Cambodian Mine Action Centre (CMAC), along with the two demining NGOs, Mines Advisory Group (MAG) and HALO Trust. Commercial demining groups have had very limited involvement in the last decade. The overall operational profile includes mine clearance, mine field marking, survey, mine awareness, EOD rapid-response, mine detection dogs and mine incident data gathering.

But in the eight or nine years of operation only a fraction of the mined areas and an extremely small proportion of the millions of mines and UXO have been successfully addressed (3). There are still very large numbers of large, identified mine fields awaiting marking and clearance, and probably many more small ones that have yet to be identified. A national Level One survey was only started in Cambodia in 2000, eight years after the international response had begun.

Estimates of the total number of mines in Cambodia have been reduced from 10 million to 4 million-6 million (and many millions of UXO) (4). Some claim the true figure of abandoned mines may be much lower(5). Numbers, however, are not the key issue: the vital issue is where they are and whom they affect through injury, death, land denial and socioeconomic debilitation. Despite the significant decrease in the past two years, the number of new mines/UXO accidents remains one of the highest in the world. Since 1979, an estimated 40,000 persons have lost limbs as a result of mine/UXO accidents and will require physical and socioeconomic rehabilitation for the rest of their lives. Mines and UXO still constitute a threat for thousands of families and an obstacle to the development of these communities. In 1998, civilians represented 50 percent of all casualties and soldiers 50 percent. In 2000, as a result of the end of hostilities and the return of the population to former conflict areas, the proportion of civilian causalities has risen to 93 percent with 30 percent of these being children under 18 years of age.

The efforts and efficient use of the resources of mine action greatly depend on effective prioritization and targeting. Also, the end-use of cleared land and who exactly benefits from mine action is of central importance. In Cambodia, a community-level request approach is being formalized and empowered through the new provincial land use planning mechanisms.

The number of mine incidents is now dropping significantly. From 1996-98 the average monthly casualty rate was 202 incidents. However, from 1999-2000 there was a dramatic decrease to an average monthly rate of 77 incidents. In October 2000, there were just 36 casualties reported. This is a very hopeful trend. Interestingly, the statistics do not indicate that the declining figures are directly linked to mine action in most areas (6). Other factors seem to be more important: the end of armed conflict and population movements, and possibly the widespread prevalence of "village demining." Although the trend is very encouraging it also suggests that planners need to understand the context in more detail to establish when, how and what type of mine action has a direct beneficial impact on levels of injury and death as well as on the socio-economic development of communities living in mined areas.

American Red Cross rehabilitation center. *c/o ICRC / Darren Whiteside*

Unofficial Mine Action

In numerous communities of subsistence farms, people have no choice but to live, travel and work in high-risk areas. In many cases people have taken it upon themselves to address the problem independently. Villagers who demine are unprotected, unofficial and work with inappropriate equipment and no safety backup. It will never be known how much land has been cleared by locals, how many villagers have been killed while attempting demining by themselves or by using land only partially cleared by other villagers. The number of mines destroyed and area of land cleared by unofficial demining is far greater than that accomplished by professional mine action agencies (7).

To some degree the prevalence of village demining and the number of people living in mined areas so many years after conflict has ceased to be an indictment of the use of landmines as well as the shortcomings of the international response to the landmines crisis.

"Villagers who demine are unprotected, unofficial and work with inappropriate equipment and no safety backup. It will never be known how much land has been cleared by locals, how many villagers have been killed while attempting demining by themselves or by using land only partially cleared by other villagers."

Findings and Lessons Learned

The following are projects supported by UNICEF for the prevention of mine incidents, which are highlighted in the recent external evaluation:

1. The Cambodian Mine Incident Database with the Cambodian Red Cross (CRC) and Handicap International (HI).
2. Community Mine Marking (with CMAC).
3. Mine Risk Education (with MAG and World Education).
4. The Integrated Mine Database (with CMAC)(8).

Mine Incident Database (MID)

UNICEF is supporting this important initiative, which it first began in 1994 in partnership with MAG. The Mine Incident Database (now implemented by the CRC/HI) charts, in detail, the changes in monthly accident rates throughout the country. Additional information collected through the victims' questionnaires provides important keys to understanding the dynamics of how and why certain groups and communities in Cambodia continue to sustain mine accidents. Addressing mine problems in a post-conflict/rehabilitation or development context is never straightforward and this database provides an excellent tool for analysis, evaluation and, more importantly, strategic planning through prioritization.

When mine action started in 1992 there was, as in all mine-affected countries, a great information deficiency concerning mine incidents and details of accidents. Initially, UNICEF supported MAG to gather mine incident data in the five most affected provinces in Cambodia, which was used to develop mine awareness messages, monitor the severity of the mine problem and advocate a global ban on their production, sale and use. Only later was it recognized as a strong planning tool for mine clearance.

Looking for a sustainable national partner, UNICEF pushed for CRC to be the main implementing agency instead of international NGOs. Unlike the international NGOs, CRC had a strong national presence with volunteer networks throughout the country, which could be harnessed to assist with data collection.

The current project structure uses 24 CRC staff data gatherers and the CRC communication network to cover the country. The data gatherers are deployed in the most affected provinces. In less affected provinces networks of communication have been created in order to remain cost-effective. Data gatherers all have motorbikes for transport and remain in constant contact with a range of local authorities and community centers (schools and health posts/hospitals) in order to ensure that every incident is reported. They individually visit every reported mine or UXO victim and complete a mine victim report form, which is sent to Phnom Penh for processing every month.

The village level incidents are collected nationally, compiled and processed in a database able to generate reports for dissemination or respond to specific queries. The total incident figures are processed with a breakdown of information that assists analysts to understand sociological details of mine victims, location of accidents, the activity, age and sex of victim, whether the victim knew they were in mined areas or not, whether it was a mine or UXO, etc. The detailed breakdown proves to be important information for mine awareness and clearance teams.

Monthly reports are distributed in both Khmer and English to government ministries and provincial departments, mine action agencies, disability organizations, embassies, donors and advocacy groups inside Cambodia, as well as internationally (9). Over 600 copies per month are printed and distributed. A bi-annual report for the 1998-1999 period was recently released. By July 2000, the whole country was covered in the most comprehensive and only national mine incident database in the world.

External Evaluation Central Findings

- The MID is performing a vital and unique function within the mine action context in Cambodia and provides valuable information that actively assists different agencies and government bodies in multiple areas of their activities: program planning, evaluation, monitoring and fund-raising.

- Considering the MID's contribution to the mine action community in Cambodia, the evaluation judged the MID to be cost-effective and inexpensive and giving great added value to the national mine action effort.

- The focus has to be on the quality of the product (i.e. the monthly report) and its effective use. As CRC depends more and more on community networks and volunteer networks it needs to work hard to establish, maintain and monitor the system. Strategies need to be developed on monitoring, testing and evaluating these emerging networks. This deals with the issue of developing quality control.

- If the currently occurring incident reduction continues, there may be reduced need for an MID in coming years. Such a situation should be welcomed by all stakeholders in the mine action sector. The role of an MID should be finite.

Population having settled in a suspected area. *c/o Chris Horwood*

Lessons Learned Of Use to the Global Landmine Community

1. An information vacuum in an affected country can lead to a simplistic understanding of the mines/UXO problem and a severe lack of planning and monitoring tools. Mine action agencies need authoritative and detailed information for strategic planning. It is a false economy to bypass this baseline information system.

2. Once a database is established, it needs to be promoted and end users shown how it can serve them in their work. The database project should be seen as a service provider to enhance the added value it offers the mine action end users. Central mine action authorities should expect mine action agencies to be actively using such a tool for resource targeting and accountability.

3. It is important that certain information be broken down beyond the province, district and commune level, right down to the village level as well as provide a service to end users for customized and targeted data breakdown. For certain agencies only the most detailed and specific breakdown will assist their targeting.

Community Mine Marking (CMM)

In 1996, confronted with the limitations of mine awareness and the shortcomings of traditional mine clearance, UNICEF became involved in the start up of the Community Mine Marking (CMM) project within CMAC. CMM consists of small mobile teams engaged in survey and high priority limited clearance accompanied by long term marking to indicate safe and/or suspected areas.

Despite its small size, CMM provides valuable service. With 12 small teams (of five men with two detectors) it has performed over 300 tasks in three years. The tasks CMM selects for marking or limited clearance are targeted and prioritized to maximize benefit from each task. One UNICEF technical advisor was attached to the CMM from July 1997 to October 2000. The project is now managed by national CMAC staff.

These de facto "mini-mobile" units of CMM fill a gap in CMAC's operational profile as CMAC has no other mobile team capacity. Comprising only 60 workers out of a total CMAC staff of over 2,750, they represent a very small unit. Large demining teams are very inflexible to smaller community needs and can only conduct a few tasks each year. Largely for logistical and administrative reasons, CMAC deploys platoons in large numbers to work on large mined areas. In addition, its top priority is to clear land for resettlement, whereas the primary goal of CMM is to decrease the risk in already mined communities.

Hundreds of communities need clearing and marking of safe passages, access and facilities in village areas that are mined. Most of the 300 tasks completed have provided safe access and/or construction of wells, schools, health centers, pagodas, roads and bridges. In all cases they have been prioritized directly by the communities themselves or by development agencies working in the areas. CMM is hence contributing to reduce the mine threat to mine-affected communities and enabling the development of basic social services, which these communities often lack.

When CMM mark the areas to be cleared they use permanent concrete markers, which are designed to indicate both the area that is guaranteed safe and the suspected area. In this respect, its marking system differs from the standard marking process that seeks to identify the boundaries of a suspected mined area, which is often imprecise. CMM is assisted by the CMAC mine awareness teams (posters, TV spots, meetings, etc.) to inform the villagers of the role of the long-term markers and the villagers' need to maintain them.

Central Findings From the External Evaluation

- In the absence of mobile teams within CMAC, CMM fulfills a critical function of response to requests in high-risk mined areas.
- CMM is flexible, highly responsive and efficient when deployed for appropriate tasks. It is also housed and based close to its area of operation to minimize daily transportation etc.
- The impact of CMM's work benefits a disproportionately high number of people when considering the relatively small areas where CMM has cleared/marked. The impact in terms of facilitation of NGO/IO intervention, community access to essential needs and access for larger CMAC demining platoons is evaluated as highly positive.
- CMM can be very effective in

facilitating rehabilitation and development work by NGOs and other U.N. agencies in terms of well drilling, school and health clinic building, etc.

Lessons Learned for the Global Mine Action Community

1. The profile of any national mine action capacity should include small mobile teams that are able to respond with speed and provide limited clearance and marking services.
2. The efficiency of such teams is highest when working on very limited clearance and marking tasks.
3. The CMM concept should be available in as many mine-affected areas as possible both in Cambodia and other affected countries. The recommendations of the external evaluation are that CMM be expanded in terms of number of teams and into other high-risk provinces as soon as possible. It may be noted that as a concept it would prove to be very attractive to various donors who may wish to fund individual teams etc.
4. CMM is effective but must be supplemented by larger-scale clearance and mine awareness. It is a damage limitation concept to offer villagers at-risk safer options, but it is by no means a full solution to a community's mine problem.
5. Limited clearance in a mined environment requires long term marking both for indicating to people the safe and suspected areas and for recording the area cleared in preparation for large scale clearance.

Mine Risk Education (MRE)

Since 1994, UNICEF has worked in partnership with MAG to develop mine awareness education with a specific child focus using various different approaches, such as community presentations, night shows, day shows, special presentations to children and women, school presentations and training sessions for teachers. These activities were carried out by MAG staff—raising questions about the sustainability of the interventions.

Based on the assumption that mine risk education in schools would be needed for many years as long as children were growing up in mined environments, UNICEF sought to support and promote mine awareness that was more sustainable, and where the Ministry of Education (MoE) had greater ownership of the approach and activities. The current MRE program was established and funded in early 1999. The new approach required the development of a close partnership with the MoE. Since 2000 UNICEF has been working with World Education (an education-centered NGO) to implement this program.

Through its funding of World Education, UNICEF is contributing to what is becoming a sustainable and formalized mine awareness program in all primary schools of Cambodia. A more intensive program for schools located in the 30 most affected districts will reach more than 1,000 schools in 130 clusters (10).

The activities of the MRE program go beyond mine awareness and the simple transfer of knowledge. The training of teachers emphasizes the use of participatory approaches, which are essential for skills, qualities and competencies that aim to affect behavioral and attitudinal changes. UNICEF expects that the whole primary education system will benefit from the improved teaching methods.

Community Mine Marking teams colaborate with local communities to set up long term markers indicating both safe and suspected areas. *c/o Chris Horwood*

Central Findings from the External Evaluation:

- The evaluation found that children receive the MRE well and the teachings are effective in terms of being able to identify safe and unsafe behavior in mined environments.
- Children not attending school in the areas targeted by MRE had limited information on mine risk behavior and were from the most vulnerable economic groups with greater daily risks to mine accidents. As a result, World Education is putting a greater emphasis on the development of techniques to reach out to school children.
- UNICEF's current strategy of developing a school-based education program in mine awareness is contributing to what is becoming a sustainable program for all primary school students in which the MoE newly enjoys a high sense of "ownership."
- The MRE program is at an early stage but has benefited from lessons learned from the previous approaches of mine awareness.

Lessons Learned for the Global Mine Action Community

1. The key lesson learned for UNICEF is that its close involvement with the MoE in the MRE should have happened some years earlier and that it is problematic developing a national and child-based program without the MoE having a strong involvement and in the initiative.
2. The MRE program is no longer being implemented by a mine action agency, but instead by an educational NGO. The evaluation found this to be an appropriate switch for UNICEF to make in terms of working towards a sustainable educational impact and should be noted by other donors who have previously only considered mine action NGOs for such a role. Clearly mine awareness education does not require mine-related technical expertise, but instead education-related expertise.
3. Any program focusing on a school-based education approach needs to develop a complementary, parallel approach to ensure that out-of-school children also receive mine awareness education.
4. The link between mine awareness and actual impact on children and their risk-taking behavior is still unknown. It is not possible to establish a direct correlation between mine awareness (as with mine clearance) and incident reduction anywhere in Cambodia. This, however, should not reduce efforts to maximize awareness and mine risk education.

Endnote

Cambodia and Afghanistan were the first countries to alert the world to the critical need for humanitarian mine action. The learning curve for these and many other national mine action programs has been steep and sudden. Mine action is still a new sector in humanitarian intervention and the challenges it faces are still immense. Although it has not been possible so far to show any direct correlation between any type of mine action and accident reduction due to the multiplicity of factors involved, various approaches to mine action should continue to be developed. It is very important to establish mechanisms to allow the most promising elements such as the ones in this article to be considered for potential implementation in other affected countries. ■

The opinions reflected in this article are those of the authors and not necessarily those of UNICEF.

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1 UNICEF is the designated focal point responsible for mine awareness education within the United Nations structure.
2 "External Evaluation of UNICEF-Supported Activities to Prevent Mine Incidents" report (by Chris Horwood and Andrea Crossland) can be obtained from Michel Le Pechoux, Children Affected by Armed Conflict Project Officer, UNICEF Cambodia.
3 Approximately 2 percent of "registered mined land."
4 "Hidden Killers: Global Demining Crisis." U.S. Department of State Publication 1998.
5 *120 Million Landmines Deployed Worldwide: Fact or Fiction.* Ilaria Bottigliero 2000.
6 The evaluation analyzed data in detail cross-referencing accident location with specific mine field clearance location as well as mine awareness education. Almost no direct correlations could be made between mine action and accident reduction.
7 Handicap International is currently completing a study of "village" or "spontaneous" demining in Cambodia. The report should be available in early 2001.
8 This section will not be included in this article due to limitations of space.
9 Reports can be obtained from the CRC office at crc@camnet.com.kh and through the Handicap International mines coordinator at himines@bigpond.com.kh.
10 A group of schools around a main school equipped with a resource center.

Thailand: The Land of Smiles (Until you take your first step)

The remnants of conflicts along the Thai-Cambodian, Lao, Malaysian and Myanmar borders affect the livelihood of about 400,000 residents. The Thailand Mine Action Center looks to reverse 40 years-worth of landmine contamination.

By Dave McCracken,
TMAC Mine Action Technical Advisor

Four Borders in Conflict

The four borders of Thailand have been prey to perpetual conflict, leaving a legacy of shattered limbs and lives. Landmines have been planted in Thailand over the past 40 years by both conventional and guerilla armies. Some combatants are long forgotten, but the morbid legacy of landmines remains where the mines were left years ago to defend borders, depopulate areas and deny the use of infrastructure, including roads and bridges, resulting in unusable land.

Initial surveys made by the Royal Thai Army and Navy in 1998 indicated that approximately 796 square kilometers of land is unusable, thus affecting the livelihood of 400,000 residents. Mine-infested land includes villages, agricultural lands and parts of national forests. Of these mined areas, there are 532 sq. km on the Thai-Cambodian border, 124 sq. km on the Thai-Lao border, 53 sq. km on the Thai-Myanmar border, and 87 sq. km on the Thai-Malaysian border.

The exact number of mines in Thailand is unknown. Moreover, information on areas suspected to be contaminated is dated and lacks accuracy, although the duration of several conflicts indicates that contamination could be severe in some areas. In order to quantify Thailand's mine problem, the National Mine Action Committee commissioned a Level One General Impact Survey in the late-1990s through the support of Norway, the United Kingdom, the United States and the United Nations. Preliminary survey reports by expert witnesses indicate that as many as 35 provinces are mine affected.

Preah Vihear, a former battlefield on the Thai-Cambodian border.

Cambodian Border

From 1979 to 1998, the Thai-Cambodian border was an arena for intense conflict. The combatants used landmines as a weapon of choice for denying access and preventing the movement of people in and out of Cambodia. The Cambodian Peoples' Armed Forces and the supporting Vietnamese Army developed special units to lay mines under the K-5 Operations Plan. The K-5 code name became synonymous with the entire border area with Thailand, focusing on the use of landmines to interdict Cambodian resistance groups entering Cambodia from Thailand.

Initially, Cambodian troops mined all of their country's border passes or ingress routes, as well as general border areas, as a protective measure. In the process, these troops often strayed unknowingly into Thai territory to plant mines along the perceived border. In response, Cambodian resistance groups would plant mines as a protective measure around Thai sanctuaries. The net result was numerous groups laying landmines for different purposes, thus compounding contamination over a prolonged conflict period. The O'Smach border area served as a prime example of the effect of mined border area on civilians. Fighting in this area in May 1998 resulted in a high level of mine contamination and significant casualties among refugees attempting to flee across the border. Thai medical facilities along the border continue to provide assistance to Cambodian landmine victims seeking emergency medical attention.

Laos Border

A long insurgency conflict was waged along the Laos border between the Thai Communist Party (TCP) and the Royal Thai Army. Landmines and booby-traps were used as principle weapons by both sides. The conflict started in 1964 when the TCP began operations in northern Thailand, Khun Nam Chan Village, Borklua District, and Nan province. The insurgencies expanded into Nakorn Phanom province and, in 1965, open warfare between government forces and the guerrilla movement began. The conflict expanded to include border provinces of Chiang Rai, Payao, Nan, Uttaradit, and Phitsanulok.

The act of warfare in Laos included laying landmines in border passages to restrict movement and as protection around guerilla and government military bases. Tactically important features such as dominant hills were also a focal point of the fighting. Military conflict continued with considerable intensity from 1968 to 1989.

Thai-Laos border units are currently cooperating to demarcate the border. This operation has resulted in 425 km of previously disputed border areas being marked as delineated. Unfortunately, the survey teams have suffered mine casualties during this operation.

Malaysian Border

Conflict along the Thai-Malaysian border between the British/Malaysian military forces and the Communist Party of Malaysia (CPM) began in the 1950s, ending in 1989. The CPM considered mines an important part of its strategy. It used factory-manufactured mines and locally produced, improvised mines/booby-traps to support its operations. Both British/Malaysian and CPM forces used mines to protect units operating in border areas in Sonkhla and Yala provinces. These operations included the protection of patrol and staging bases for counter insurgency and guerilla operations. Mine laying activities by all parties peaked during the mid-1970s and early 1980s.

The CPM also established tunneled base areas in remote jungles along the border. These areas were inaccessible by road when initially established. Infrastructure development in past years, including road construction in these remote areas, has brought the population in contact with mined areas.

The CPM ceased hostilities in 1989, formally signing a treaty. The use of landmines has ceased on both sides of the border since implementation of the peace treaty. The CPM has claimed that most of the landmines and booby-traps were removed in the 1980s. However, landmine accidents continue to occur in border areas.

Myanmar (Burma) Border

In 1945, Burma gained independence from the British government. However, in 1948 minority groups claimed independence from the central Burmese government and set up resistance groups. Fighting among resistance groups and the Myanmar government continues today in border areas, frequently spilling over into Thai territory. Currently, the federal government's State Law Order Restoration Council (SLORC) military units are engaged in an ongoing conflict with minority groups. The intensity of this conflict significantly changed in 1995 when some of the minority groups joined with the government and increased military activities. Meanwhile, there have been frequent clashes in the border areas opposite Kanchantaburi, Ratchaburi, Tak, Mae Hong Song, and Chiang Mai provinces.

As in other border countries, mines produced in Myanmar are used to deny access to both border passes and residential areas. With military conflicts raging on, high numbers of ethnic minorities are fleeing for sanctuary in Thailand. Many of these refugees, along with animals such as elephants, have become casualties of mines laid by Myanmar government forces to interdict ethnic minority guerilla groups. In addition, mines and improvised devices are causing casualties in Thai agricultural areas, seriously affecting farming communities.

The conflict along the Myanmar border will continue for the foreseeable future as mine laying has increased. A record of the past and present mine situation is needed to ensure that these hazardous areas are identified for future humanitarian clearance operations.

Mine Action in Thailand

The combination of terrain and mine threats challenge mine action efforts in Thailand, especially with the country's combination of three-canopy jungles, mountains, laterite soils, the monsoon season, and a host of tropical diseases. The scattering of low-metal content AP pressure mines over a 30-year period also provide for a very dangerous environment for mine clearance operations. The solution to these situations is integration of the latest technology and techniques to safely deploy deminers and equipment.

The Royal Thai Army and Navy began demining border areas in 1987. Field units clear an average of 2,500 to 3,000 mines each year along all four borders. The First Army's Burapha Field Force (responsible for the security in Sa Keao province) is making one such effort. About 63 sq. km of Sa Keao are suspected to be mine-infested. From 1994-99, a total of 2,837 landmines (including AT mines, AP mines, and UXO) were cleared and destroyed by the Burapha Field Force in both general EOD and small clearance tasks, which are normally conducted using tactical methods.

The Royal Thai Government (RTG) recognizes that landmines are and will continue to be a major obstacle to development and economic growth in rural border

communities. Thailand acknowledged the importance of the mine threat along its own borders by signing the Ottawa Convention on Dec. 3, 1997. The country has readily demonstrated its will to prohibit the use, stockpiling, production and transfer of AP mines, and to destroy all of its stockpiled AP mines. Thailand has also undertaken to identify, demarcate and destroy all AP mines in mined areas under its jurisdiction. On Nov. 27, 1998, Thailand deposited its ratification instrument at the United Nations, becoming the 53 nation, and the first in Southeast Asia, to ratify the Ottawa Convention.

The National Mine Action Committee

In August 1998, an order from the Office of the Prime Minister of Thailand was issued forming the National Mine Action Committee (NMAC). The prime minister directs and chairs NMAC, which was formed to address landmine issues. NMAC membership consists of all major government ministries and departments of the RTG.

NMAC monitors the obligations set forth by the Ottawa Convention and develops policy for the monitoring of national strategic objectives, including:

- Implementing laws prohibiting the use of APLs;
- Overseeing demining operations;
- Establishing a minimum quantity of APLs in the country for the purpose of education and demining only;
- Coordinating overseas and international community support; and
- Disseminating information and providing assistance to the population and improving the environment for those people affected by APLs.

NMAC established the Thailand Mine Action Center (TMAC) on Jan. 18, 1999, in Don Muang, Bangkok. TMAC serves as the central control over all APL issues and operations in Thailand.

TMAC

On Jan. 18, 2000, TMAC was officially declared a working facility under the authority of the Thai Supreme Command and with Royal Patronage provided by Her Royal Highness Galiyani. This unique bestowing of royal patronage demonstrates the level of commitment and concern the problem of landmines has stirred in the Thai people.

TMAC serves as the center for the full range of mine action issues in Thailand, including coordination with all international organizations and donors. TMAC operations encompass mine/UXO awareness, mine/UXO clearance, mine/UXO survey, and victim assistance activities throughout Thailand. The mine action organization monitors the timelines set by the Ottawa Convention and has developed a mine action program to meet the convention obligations, including AP stockpile destruction. The first bulk demolition of 10,000 landmines occurred on May 1, 1999 at a military base in Lop Buri, Thailand, followed by a second bulk destruction on January 18, 2001 of 1,000 M14 AP Blast mines.

TMAC is responsible for preparing and coordinating the implementation of a national mine clearance plan. Thailand developed an initial "Master Plan on Humanitarian Mine Action of Thailand" for a four-year period (2000-2004). Seven Humanitarian Mine Action Units (HMAUs), each with 99 personnel, will be established along the problem borders. TMAC has trained personnel to work in the HMAUs. HMAU #1 HQ, which is partially supported by U.S. contributions to the FY2001 program, is deployed at Wattana Nakon, Sa Keow province. This demining unit includes a mine awareness team, technical survey team, mine detection dog (MDD) team, manual demining team and a mechanical assistance team. The units are stationed in Nong Ya Keaw village on the Thai-Cambodian border. The duties of each HMAU include local coordination of mine action activities such as public relations, mine awareness, information collection, technical survey and demining.

Humanitarian Mine Action Funding

The funding for humanitarian mine action in Thailand has come from a number of international sources, as well as from within the country. The RTG passed a supplementary budget in March 2000 of 1.6 million Thai Baht (THB) (about U.S.$32,000) to initiate mine action by HMAU #1 in Sa Keaw province. An additional 16.246 million THB (about U.S.$325,000) was added to TMAC operational capacity for mine action efforts in July 2000. The total mine action budget allocation for FY2001 is 44 million THB (about U.S.$880,000). In addition, the U.S. government has provided funding and support in:

- Infrastructure development and technical advisory support;
- training support;
- equipment acquisition and operational support;
- regional capacity development; and
- TMAC capacity training ("train the trainers" and mine detection dog team training)

U.S. mechanical assistance to demining (namely HMAU #1) support has been provided through the deployment of two mechanical systems for trail evaluation: TEMPEST and SDTT (Survivable Demining Tractor and Tools). TEMPEST, a remote-controlled machine, clears vegetation in support of demining operations, while SDTT also clears vegetation, but requires "hands-on" control.

Meanwhile, the Canadian Center for Mine Action Technologies (CCMAT) will provide a BRM48 (PROMAC) for trail evaluation. The BRM48 is an attachment mounted on an armored tracked excavator. Canada will also contribute explosives that are specially designed for humanitarian demining operations, called FIXOR.

Mine Awareness

TMAC recognizes that mine awareness is a priority for reducing the number of landmine/UXO accidents in Thailand. TMAC works closely with other organizations in developing accident-reducing, mine awareness curricula at both the local and national level. To date, a total of about 46,000 civilians in some 40 border-area villages have received mine awareness education from HMAU #1.

Overview

There is a commonly held view of Thailand as a vacationer's haven with spectacular beaches, exotic animals, and Buddhist temples. All of these attractions can be found in Thailand. However, it is important to note that within a few hours driving distance, Thai people are living in mine-affected communities, watching neighbors lose life and limb. Thailand recognizes the importance of a strong commitment to ridding it self of landmines, teaching people to avoid landmines and in assisting mine victims.

Initial efforts by the RTG to mobilize its national assets for dealing with this problem are noteworthy. Scarce fiscal resources and technical challenges are clear indications that no poor country can handle mine problems alone. TMAC has started effective mine action coordination and operations. Although TMAC's efforts are modest in size compared to the mine problem, the mine action organization's work has formed a basis for future mine clearance and awareness efforts. Thailand faces decades of challenging work to rid landmines from its soil. All assistance to jumpstart this indigenous program is received with gratitude and enhances Thailand's determination to make strides in this long process. ■

Other International Funding:

Norway U.S.$320,000 (16 million THB)
* Level 1 Survey (TMAC)

United Kingdom U.S.$400,000 (£273,000)
* Level 1 Survey (TMAC)

Japan U.S.$400,000 (¥48 million)
* United Nations Voluntary Trust Fund

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■ (far left) TEMPEST operates in thick brush on the Thai-Cambodian border.

■ TEMPEST clears a lane. Ban Nong Ya Keaw village, Thai-Cambodian border.

All photos courtesy of the author.

Bombs Away: A Proactive Approach

UXO clearance in Guam and the Pacific Islands is considered mostly "emergency removal." The Journal examines how improper disposal, fatalities and a lack of survey or accident data compounds the problem for this region.

by Lisa M. Vanada, *MAIC*

In 1941, Japanese forces invaded Guam, making it the only populated U.S. territory to endure foreign occupation. Three years later the United States recovered Guam and drove the Japanese from the island. The bloodshed from the conflict continues throughout Guam, Saipan, Tinian and Palau over 50 years later, due to the UXO and landmines that still pollute the islands. Although the United States provides mine clearance services to the area, Paul Murray, president of Bombs Away, a UXO-specializing firm primarily servicing Micronesia and Southeast Asia, expressed his concern that this mine action may not be sufficient.

The U.S. military EOD teams participate in over 225 emergency UXO/landmine clearance operations in Guam every year. Unfortunately, this figure only reflects situations where emergency assistance was specifically requested. The Navy EOD unit stationed on Guam sends a six-man EOD detachment as a response team only; they are not authorized to locate and clear mines under their own initiative. This means that hundreds of undetected mines lay in wait. Murray demonstrated his frustration with a question: "How do you think most of these mines are found?" The mine-related death and injury statistics provide the answer: children and construction workers frequently find these mines, often with fatal results.

The U.S. military estimates that 25 percent of all ordnance used during World War II failed to detonate as intended. In spite of ongoing clearance, mines still litter Pacific Island battle sites. Murray believes the demining process could be greatly accelerated with a proactive mine clearance approach that encompasses thoroughness, historical research and initiative.

Background

As a former member of U.S. Navy EOD teams, Paul Murray has extensive military demining experience. He was awarded the Navy Commendation for Valor after disarming over 60 Iraqi sea mines, demolition traps and anti-shipping mines, and he was deployed on numerous diving and demolition exercises throughout Asia. After being stationed in Guam, Murray decided to settle there. In 1994, a friend asked him to help with mine clearance in the southern tip of Saipan. The friend had taken a team to survey the region, which was used as a munitions dump after World War II. Although a B29 explosion destroyed many of the munitions in a 1946 crash, the team found an overwhelming amount of UXO, for which it needed demining assistance.

This was the start of Bombs Away, Inc., a multi-service firm specializing in UXO, diving and geophysical testing technologies. The UXO services encompass historical research, which is used to determine potential UXO locations and contamination levels; site assessment and surveys; UXO clearance and disposal; UXO safety and awareness training; and the development of policy and procedure manuals for UXO response. Murray's opinions regarding inefficient demining techniques are substantiated by his experiences and observations in Micronesia and Southeast Asia.

Past and Future Problems

Mine clearance activities in the Pacific Islands are often unregulated or loosely regulated. The lack of government support frequently correlates with improper UXO disposal. Without a designated disposal site, cleared materials are simply dumped in a convenient location, which is often an empty neighboring plot that will be developed at a later date. When a company or individual decides to develop the neighboring plot, the mines will need to be moved again. This system wastes time, increases danger and could easily be avoided with better disposal choices.

There are no government policies in Palau for the disposal of bombs, so contractors find it easy to cut corners. Murray related a situation clarifying that bomb disposal is not simply a matter of carelessness, but is one of convenience. A Bombs Away team was hired by a civilian contractor to clear bombs from a channel. The contractor wanted to dredge the channel through the mangroves, but it was contaminated with 500-pound bombs. Bombs Away divers placed slings beneath the bombs and used diving regulators to fill lift balloons and float the bombs to the water's surface. It would have been simple to discard the bombs in a nearby uninhabited forest. Instead, the team took the time and effort to transport the bombs across the town to a remote munitions dump.

UXO disposal problems also exist in Guam. Construction companies are rapidly developing the island to clear the land for businesses and homes. Because there are few regulations, many construction companies focus primarily on immediate profit, and little concern is given to the next developer. Murray said that the workers "dig up UXO and throw it on the next piece of undeveloped property." This method may remove the danger from a specific area but it adds to the UXO problems in the remaining land. Government regulations and professional standards must be altered to consider the long-term affects of mine action.

Initiative with Historical Research

History and statistics indicate that the Pacific Rim is heavily contaminated with UXO, but many of the governments lack solid policies and mine action support. Guam was the site of some of the heaviest pre-invasion bombardment in World War II. The island endured heavy bombing and shelling for several weeks prior to the U.S. military's land invasion, and millions of ordnance items were scattered throughout the Pacific Rim. Dud rates conclude that 25 percent of the ordnance failed to detonate, and these abandoned items present a high risk to local residents. If the governments and existing mine clearance organizations would adopt a proactive stance, the risk for children and civilians would decrease.

Some of the existing safety policies produce negativity among the workers, who consider some of the policies extraneous and contradictory. Demining workers are exasperated by safety inspections that involve citations for workers without a plastic hat or steel-toed boots; they think that a government concerned with these types of details should focus on the life-threatening potential of the mines. Murray thinks the overall safety of the islands could be increased if the deminers applied proactive methods. Job specifications could be improved with research and should include history, terrain and prior mine activity. Reliable safety precautions, such as UXO sweeps prior to earthmoving, should also be incorporated.

Murray emphasizes the role history plays as a UXO indicator and admitted that he has yet to understand why the government infrequently initiates clearance operations on major battle sites known for UXO contamination. The beaches on the west coast of Guam near Agat were stormed frequently during World War II. As a known area of conflict, the risk for UXO contamination in that region is high. After a heavy rainstorm, a Chamorro (native) boy found a hand grenade in the sand. Although it was compromised by moisture, the grenade began smoking when he picked it up. He immediately threw it 20 feet away, but the weak explosion injured his foot. Most government and military mine operations are formed as a response to a recent call, not a response to the problem that was created 55 years ago. Emphasis should be placed on initiative, and the governments should use historical records and Chamorro reports to proactively clear mines and prevent accidents.

Cooperation and Support

Although successful demining projects rely on technical expertise, training, experience and extensive

research, the overall success of mine action hinges on community support and cooperation. Mine action is a humanitarian and life-preserving effort, but if demining projects infringe on a resource valued by the community, support for demining will be diminished instead of increased. The public voice plays a crucial role in government decisions and regulations: If deminers seek a balance between public opinion and mine clearance activities, the resulting positive publicity can only benefit the global mine action community.

The significant role of public opinion was demonstrated by an incident in Sonsonaya Bay, Rota. As part of the Commonwealth of Northern Marianas Islands (CNMI), Rota currently flourishes from the diving industry. Tourists and divers form a substantial economic force that the island depends on for profit. Divers swim around sunken ships that have nearly been enveloped by coral, but unexploded depth charges are still partially visible. The ships and depth charges are remnants from World War II, when two Japanese submarine chasers anchored in the bay. Allied forces flying over the bay dropped leftover bombs on the Japanese ships before they landed at Tinian. These wooden Japanese ships were unoccupied when they sank, and as submarine chasers they contained the depth charges, which Murray describes as similar in appearance to a 50-gallon drum.

The government of Rota sent a removal request to the Navy EOD unit, fearing the depth charges presented a risk for the local diving community. The Navy EOD team that arrived to survey the depth charges also observed a few bombs in the sunken ships. They were authorized by Rota to return and blow up the bombs. The Navy returned with 25 team members; they destroyed the bombs but also devastated the coral gardens and killed a rare hawksbill turtle. The resulting public furor was immense: the diving community was outraged and protested the return of the Navy EOD team. Unfortunately, six depth charges remained on the ships.

Murray contacted the governor of the CNMI and, after providing his qualifications, informed him that if the ships were unoccupied and at anchor when they were bombed there would be no fuses. Murray relies on historical and military research and experience. He knew that unoccupied ships at anchor never store fuses with ordnance. After diving and confirming the absence of fuses, the Bombs Away diving team chipped the depth charges out of the reef using rebar with a filed edge. The six bombs were then rolled onto a tuna net and hauled to the surface for disposal.

Interestingly, the Sonsonaya Bay project received a great deal of notoriety not for the actual demining effort, but for the methods used to extract the depth charges and preserve the underwater environment. Environmental supporters and the diving community lauded the Rota government for revising its clearance effort. By cooperating with the community and endorsing a mine clearance method that maintained the natural tourist attraction, the government succeeded in alleviating a known risk while promoting environment-friendly demining. Local newspapers and journalists further publicized the project and the cooperative demining effort raised public UXO awareness in a positive way.

Mine Action for the Pacific Rim

The lack of government regulations and widespread concern for mine contamination in the Pacific Rim leaves a problem without a clear solution. The islands and Chamorro people are left with a World War II legacy that is dissolving slowly, for although mine action is offered as a response to injuries and unprofessional discoveries, little initiative is taken to locate and clear most of the islands.

Without efficient UXO removal, Murray's pointed question remains, "How do you think most of these mines are found?" Hundreds of injured or surviving civilians attest to the risk these islanders face every day. To change the answer to this question, mine action in the Pacific Rim must be proactive, thorough and cooperative. Active collaboration between the government and demining organizations could promote effective long-term mine clearance. By consolidating effort and resources, they could accelerate the process of eradicating the remnants from a history of unwelcome invaders. ■

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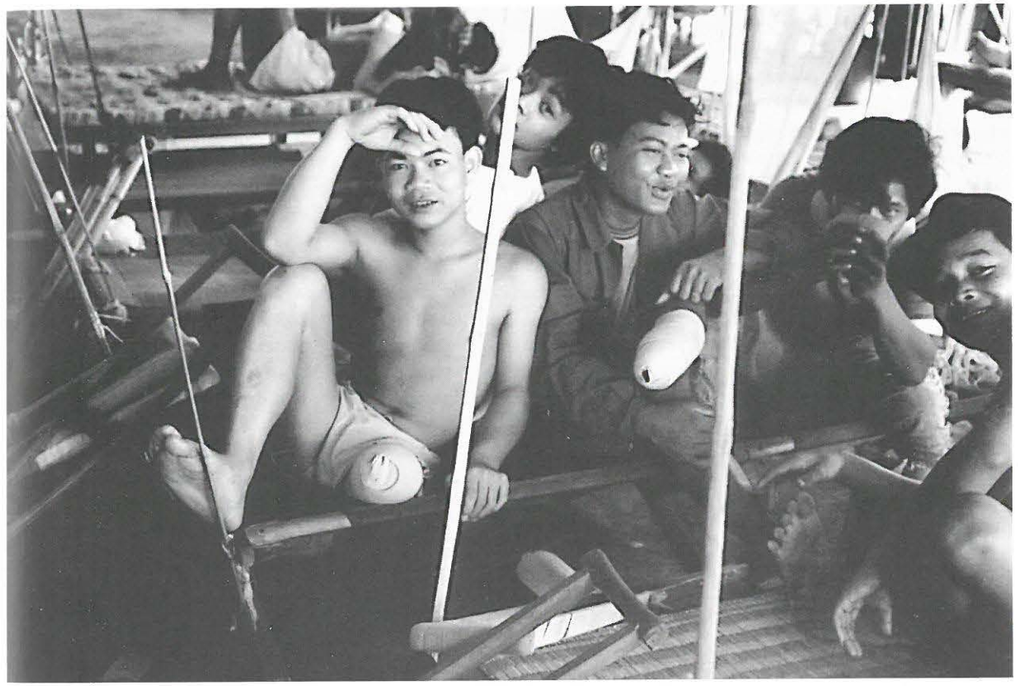
Photographing Tragedy:
Landmines and Victims

Tim Grant recounts his experiences capturing the images of landmines and the stories of their victims on film. From buckets of AP mines to victims on the operating table, Grant sees and tells all about the images that have shaped him.



■ Borey and his friends. Khoa-I-Dang rehabilitation center. *c/o Tim Grant*

By Tim Grant, *Landmine Photographer*

Landmines are insidious devices. A landmine can be any munition placed under, on or near the ground or other surface area that is designed to be detonated or exploded by the presence, proximity or contact of a person or vehicle. Their main purpose is to inflict severe injury on the "enemy" so as to hinder advance and undermine the morale. Only a few mines are designed to kill outright. For every combatant injured it takes another two soldiers to carry them, effectively taking up to three fighters out of the battle.

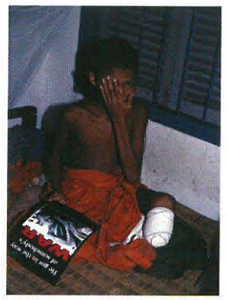
My initial experiences with landmines came as an employee of the Land Mine Awareness Programme (LMAP) that started in 1990 on the Thai/Cambodian border. After testing the education materials we had produced, it was found that the people wanted to see photographs of real mines and of landmine victims. The mines reproduced in the photographs were always shown as close as possible to their actual size. After several years of working in mine awareness, we found that photographs were very popular, generating much more interest than illustrations because people can relate more to them, especially when the images are taken in areas familiar to them.

Photographing my first mine was an experience I shall always remember. At that time, it was illegal for foreigners

to enter Cambodia. As we were based in Thailand, a neutral country, there were no mines readily available for photographing and measuring. We needed photographs for the education materials, so we had to rely on viewing mines collected by the Thai military from their side of the border.

The Thai soldiers brought out an old bucket crammed with a variety of AP devices. It was a strange feeling to finally see these objects that we had heard so much about. For a second or two I forgot all the terror and sadness they cause and was eager to examine them closely. My colleague, who had just arrived from four years of teaching landmine awareness to Afghan refugees, was quite nervous and kept reminding me of situations where experts had blown themselves up by mishandling mines.

The soldiers were quite relaxed around the live ammunition, wanting to show us how "brave" they were and how much knowledge they possessed about ordnance. One of them started to pull, prod and turn anything that stuck out. He then proceeded to unscrew the top off an AT mine, prompting my colleague to take refuge behind a filing cabinet. In hindsight, this action seemed useless since, had the mine exploded, the whole building would have been destroyed. I also realized that I was too trusting of the soldier's ability in handling these devices. It took a few more visits to hospitals and operating theatres before I formed a realistic view and healthy dislike for any landmine or UXO.



A 16-year-old monk injured by stepping on a landmine on his way back from a wedding ceremony.
c/o Tim Grant

Photographing the Victims

Photographs make the plight of mine victims more meaningful to viewers and starkly reveal the horror associated with mine injuries. As the program's media coordinator, it was my job to capture these images.

The first time I photographed a landmine victim is still very vivid in my mind. It was in the Site II refugee camp on the Thai/Cambodian border in 1986. I was being shown the different programs that were operated by one of the local NGOs. We came to the Disabled Skills Training Center, which was run by a Jesuit priest. A photo opportunity quickly appeared in front of me as I entered the facility: a wheelchair bound, double leg amputee with his baby sitting on his lap. I was initially reticent about taking this photograph. However, the center's resident priest realized my dilemma and assured me it was OK, so I went ahead. As I snapped the shot, the man smiled and told me he was honored that I had chosen he and his child to be photographed—the first of many surprises.

To facilitate the production of teaching materials I made many excursions to the camp hospitals and rehabilitation centers to take photos. The power of these experiences in dirt-floor, bamboo walled rehabilitation centers and cold concrete floored operating rooms was overwhelming. Most of the victims were young men in their late teens or early 20s. Despite their suffering and traumatic amputations, most were quick with a smile and a joke. This made being there and taking photos a mixture of pleasure and pain. Here in the hospital, surrounded by fellow victims, they started to come to terms with their dramatic change of lifestyle. I worried about what would happen when they returned to their villages, where they would be without free medicine, adequate medical attention and, more importantly, the moral support of their new friends.

Upon arrival at the International Committee of the Red Cross (ICRC) in-patient section one day, two new victims from Cambodia drew my interest. One of them was a woman who had had her right leg blown off—fortunately below the knee. She was very frightened as it was all so new to her—sealed rooms with concrete floors, white-skinned people with dangling objects around their necks, plastic covered furniture, and, above all, life with only one and a half legs. The other victim was a man having an old wound checked. He seemed flattered to have a foreign nurse attend to him and show an interest in his recently sown stump, which now looked like the fluted edge of a piecrust.

Soon, a busy doctor came in and thoughtlessly tugged on a piece of gauze that was deeply embedded in the wound. The man jumped, then smiled and made a joke with the nurse. "How can he still find humor in this madness?" I asked myself. He was like a brave young boy with a grazed knee who didn't want to show his friends his pain. She was like a terrified little girl waiting her turn for an injection, twitching and wringing the sarong she clasped tightly in her hands. I was so distracted by their dilemmas that I didn't take any photographs.

After awhile, I started to enjoy my visits to the hospital, as I received such a great welcome from the patients, who really appreciated a foreigner taking such an interest in their welfare. It was hard at times to remain impartial and I had to "turn-off" many times to enable myself to cope with the tragedies before me. The victims were generally so young and now their lives had been torn apart, more than they could possibly comprehend at that time.

I had received permission from ICRC to photograph mine victims in Khao-I-Dang Hospital, so I made my way there, most days equipped with my photographic gear. The head nurse knew me well and would greet me.

One day, I arrived at the hospital and was instantly taken by the arm and hustled into the theatre, not knowing what to expect. A mask and hairnet were thrust into my hands as I was pushed through the doorway. A 17-year-old boy had been wounded when a landmine exploded nearby. They already had his stomach laid out on the operating table, expertly searching for shrapnel pieces. This was the first time I had witnessed an operation, and I wondered how I would handle it. I trained my camera onto the surgical scene. Here in front of me was this kid with his insides spilled out, and all I could feel was fascination as I viewed, through a lens, the skilled hands of the surgeon as he probed his way into the open cavity.

The surgeon eventually located a tiny piece of metal, smaller than a 5-cent piece. I glanced at the cut, which started at the top of his chest and finished just above his navel, then to this tiny intruder and pondered the inhumanity of it. They roughly threw his guts back in and stitched the wound. "We will just close this up and do a routine check of his leg, then he should be okay," the doctor informed me.

Following the surgery, I was starting to feel that I must be fairly brave. But in spite of this sentiment, when they sentiment, when they brought in the next victim I began to think I had chosen the wrong vocation. The second surgery was not as easy to handle. This man's wounds were older and had become infected. The surgeon had to cut off more of his stump and dress the wound. I took a few images and decided that this time I couldn't stay any longer.

Several days after the surgery, I returned to the hospital to follow up with the photo stories of both victims. I found the older man, his wife dutifully fanning his body as he slept. She was lost in her thoughts and hardly noticed my presence. The nurse informed me that the 17-year-old, Phon Phea, was in bed no. 45. I couldn't believe what I saw as I approached. He had only one leg! A feeling of shock hit me. When I had left him in the surgery there was no indication that an amputation was necessary. He was, after all, only hit by two small pieces of shrapnel. I called the nurse over and asked the reason for the amputation. I was told that apart from the chest injury, the second piece had severed a main leg artery. As I drove back to town I saw groups of Thai youths, about the same age as Phea, enjoying a football match—it just didn't seem fair to the victims. ■

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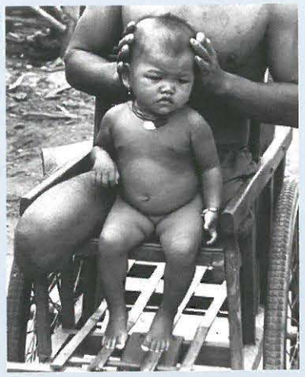


The first land-mine victim I photographed at Site II Refugee Camp.
c/o Tim Grant

How to Help...

Those interested can help the plight of landmine victims by generating publicity. This can be achieved by writing a story for a magazine, sending a letter to the editor of a newspaper, or writing an opinion/editorial piece for your local newspaper to express your concern.

One could also make a website, organize an event/exhibition, design a poster, go on the radio, raise funds or appear on television programs to discuss the landmine issues.

Supporters are also welcome to visit my website (www.iinet.net.au/~pictim) and use the photographs for advocacy purposes.

- Tim Grant

U.S. Efforts
Strengthen Pledge to Vietnam

The Vietnam Veterans Memorial Fund estimates that 2,000 Vietnamese are killed each year by mines and UXO. In response to this, the U.S. government, VVMF and Clear Path International are focusing on the country's landmine victims.

By Stacy L. Smith, *MAIC*

In November 2000, former President Bill Clinton traveled to Vietnam to celebrate the 25th anniversary of the end of the Vietnam War. At a ceremony honoring efforts to clear an estimated 3 million landmines and 300,000 tons of UXO scattered throughout Vietnam, Clinton vowed to help remove mine threats in Vietnam, Africa and the Balkans. He said: "You will have America's support until you have found every landmine and every piece of unexploded ordnance. This is a tragedy for which peace produces no answer."

In June 2000, the U.S. government allocated $3.1 million (U.S.) to support humanitarian demining efforts in Vietnam. Of this total, $1.7 million will go towards the purchase of equipment such as vehicles, personal safety gear and landmine/UXO detectors; $1.4 million will be designated for a level one national survey to determine the scope of the landmine problem and make recommendations for resolving it; $200,000 will be allotted to develop a computer system to record the locations and types of ordnance used during the Vietnam War; and $80,000 will be used for a computer system to assist the Vietnamese in managing their demining program.

Following Clinton's promise to rid Vietnam of landmines, two non-profit organizations, Vietnam Veterans Memorial Fund and Clear Path International, introduced projects intended to stop the deaths of innocent civilians from escalating. Currently, an average of six deaths occur daily in Vietnam as a result of landmines/UXO.

Vietnam Veterans Memorial Fund

Project RENEW

On Dec. 4, 2000, the Vietnam Veterans Memorial Fund (VVMF) revealed a plan to form the first-ever comprehensive program targeted at saving lives and preventing injuries in Vietnam. The two-year pilot project in Trieu Phong District of Vietnam's Quang Tri province is designed "to restore the use of lands of the Vietnamese through education and neutralization of the effects of the Vietnam war." The non-profit organization's model for landmine/UXO clearance is called Project RENEW. According to Jan C. Scruggs, VVMF president, Project RENEW combines the efforts of several international NGOs, including PeaceTrees Vietnam, Catholic Relief Services and Counterpart International, with the Quang Tri Province People's Committee in Vietnam. "We plan to show that a comprehensive approach benefits the people of Quang Tri province," Scruggs said, "and also the organizations that are assisting with this effort. We also hope to show that government agencies and non-governmental groups can work successfully together."

Assessing the Situation

According to a Dec. 4, 2000, VVMF press release, Vietnamese officials estimate that approximately 2,000 civilian deaths result each year from landmines/UXO. Since the end of the war in 1975, approximately 40,000 civilian deaths have been caused by landmines/UXO with nearly 1,500 of those occurring in Trieu Phong District. VVMF hopes that Project RENEW will reduce the risks that landmines/UXO pose to civilians.

In the early planning stages of the program, VVMF met with officials from international NGOs, the Vietnamese government, and the U.S. Department of State to discuss Vietnam's landmine/UXO problem. "We were told time and time again that a single comprehensive effort was needed," Scruggs said. With the help of international NGOs and the Quang Tri Province People's Committee, Project RENEW will accomplish its all-inclusive goal through mine education and awareness, mine clearance, land resettlement and victim assistance. "We feel that by several different groups helping with this effort, we will be able to make significant progress in a shorter amount of time and the people of Quang Tri will benefit significantly from the collaborative system," Scruggs said.

Projections

With matching $250,000 grants from the E*TRADE Group, Inc., a global leader in online personal financial services based in Menlo Park, Calif., and the Freeman Foundation in Stowe, Vt., an office of international cooperation will be established in Quang Tri province as a center for information exchange between all parties. The center will also address potential problems and obstacles arising during the pilot project. If successful, VVMF hopes to implement Project RENEW in other mine-affected countries such as Laos and Cambodia. "We have a lot of work to do in Vietnam before we move on to other countries," Scruggs said. "What we hope to have after two years is a useful approach that can easily be implemented in other affected lands."

Clear Path International

Current Projects

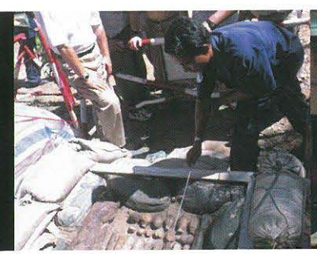
In December 2000, Clear Path International began a two-year project in Vietnam that will clear 125 acres of land for later construction of housing in Dong Ha Town, Quang Tri province. During the Vietnam War, the clearance site head-quartered the U.S. 3rd Marine Division and was known as Dong Ha Combat Base. According to Martha Hathaway, project director for Vietnam, this project will eliminate the fears of local children and their families. "For 30 years, the people of Vietnam have lived with the threat of landmines and bombs in their communities," she said. "Clear Path International hopes to remove these obstacles that stand in the way of the health and safety of children in Vietnam." The project hopes to rid the area of the threat of landmines/UXO on two levels: mine clearance and victim assistance.

Mine clearance will be executed with the help of UXB International, a commercial humanitarian demining company in Ashburn, Va. UXB International will provide management, technical supervision, equipment and accommodations for demining teams. It will also train local Vietnamese deminers to carry out the clearance of landmines and UXO using safe techniques and procedures. Hathaway believes that a methodical demining process is key to a successful clearance project. She said, "Clear Path International believes that the most paramount concerns are safety and quality, and in order to ensure safety and quality the process of clearance is time and resource intensive."

In addition to the clearance project, Clear Path International is also working to facilitate accident survivors in the area. While the organization primarily benefits children who have sustained debilitating injuries as a result of landmine or UXO explosions, the program also provides monetary compensation to the families of affected children. With the support of







the Committee for the Care and Protection of Children, Clear Path International is able to give injured children emergency medical treatment, surgery, long-term health care, nutritional support and special scholarships. Funding for this project was received from a grant from the Freeman Foundation and contributions from individuals and foundations such as the Francis Finlay Foundation.

The Mission

Clear Path International is a nonprofit organization founded in September 2000. Its efforts are concentrated in the war-torn countries of Southeast Asia. The goals of the organization include raising awareness of the landmine/UXO problem, providing money and resources for demining and victim assistance projects, and sponsoring programs to remove landmines/UXO and assist victims of landmine/UXO explosions. Through these goals, Clear Path International hopes to accomplish its mission: to clear obstacles that stand in the way of the health, safety and development of children and their families.

A Plan for the Future

Clear Path International hopes to empower local residents and agencies in mine-affected countries by creating "an in-country capacity that can sustain the demining and victim assistance activities well into the future, independently or with minimal support from the international community." By involving local residents and agencies from the start, "a handover of management and implementation of the project(s) to a team of qualified domestic deminers with only periodic technical monitoring from the contractor, but with the presence of a full-time Clear Path International representative" is possible. For the time being, Clear Path International's efforts on behalf of the health, safety and development of mine-affected children and their families will be limited to Vietnam and Cambodia. In the future, the organization hopes to expand its project scope to Laos and Thailand.

Conclusion

While President Clinton's pledge to the Vietnamese government has led to dedicated efforts to rid Vietnam of landmines/UXO, the Bush administration has yet to make a statement on the future of U.S. involvement in landmine policy. Before leaving office, Clinton commented on the progress of his administration and encouraged the Bush administration to maintain U.S. efforts. "While I am proud that we have made substantial progress towards eliminating the threat landmines pose to innocent civilians around the world," Clinton wrote on Jan. 19, 2001, "there is work yet to be done. I urge the next administration to build on our progress and take the steps necessary to allow the United States to eventually sign the Ottawa Convention, while still meeting our security needs and protecting our men and women in uniform." ■

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Photos c/o VVMF, CPI and MAIC

RHINO in Cambodia

RHINO, a large and powerful demining tool geared towards large clearance operations, has been put to the test—both on testing grounds and in the field. The result: a level of performance and operability that alleviates the concerns of critics.

By **Manfred Joehnk**, ***Program Manager***

Background

The mechanical demining system RHINO was developed internally by Rheinmetall Landsysteme GmbH (RLS) in Kiel, Germany, to provide a more cost effective and safe demining tool. It is superior to existing systems in terms of efficiency, safety and clearing capacity and is especially well suited for large area demining operations. RHINO is large (9.5 m long, 3.1 m wide and 3.5 m high), powerful (660 kW caterpillar engine), robust (weighs 58 metric tons) and is fully remotely controlled. RHINO is a serious demining machine, as opposed to a mechanical machine whose purpose it is to assist the manual deminers.

This article summarizes RHINO and the user experience during a field test and subsequent demining task conducted in Cambodia from August 1999 to May 2000. The test and the accompanying demining task in support of CARE took place in two remote areas in Battambang province. The main objective of the task was to accelerate the demining process to help accommodate the need for land for returning refugees. This was a major two-year project involving the resettlement of aproximately 4,000 families.

The Cambodian Mine Action Center (CMAC), a state run organization, is responsible for the conduct of mine clearance actions. The CMAC staff is assisted by international advisors from the United Nations and NGOs, as well as soldiers from countries such as Canada, Australia, Belgium and the Netherlands. The test and subsequent demining action were managed and performed by CMAC with the technical assistance of two RLS employees. After the initial training, their role was mainly to provide further training on the job for tasks such as unscheduled maintenance. Mine clearing in Cambodia represents a serious challenge. The environmental conditions are tropical and severe. The infrastructure is typical of a developing country. The mine problem itself is further complicated by the fact that there are numerous types of mines and UXOs, and poorly marked mine-infested areas.

■ RHINO with dozer blade is transported to the test area, just bypassing a bailey bridge. *c/o RHINO*

Operation by Indigenous Personnel

Training on RHINO began when it arrived by barge at Sihanoukville. The RLS technicians trained three mechanics and two electricians in the operation and maintenance of RHINO. While lacking theoretical knowledge, the trainees were skilled workers and eager to learn. In a few short days they could handle the day-to-day operations and, soon after, maintenance of the vehicle. In a few weeks, they operated the system without the oversight of the RLS technicians. The five trainees were organized in two operation/maintenance teams of two, each with the fifth being responsible for supply operations.

The challenge of leading the demining platoon was given to a CMAC technician who was assisted by a former leader of a mine marking team. They were initially trained and supervised by a French technical advisor. Manual deminers, drivers and guards rounded out the team. The platoon not only clearly demonstrated that indigenous personnel could operate and maintain RHINO, but that they also work hard and perform in a highly proficient manner throughout the initial test and subsequent tasks.

Infrastructure

There is no question that mechanical demining machines are huge.The concern is that they are too big to be transported and will damage the infrastructure of developing nations. While the RHINO is a big machine, ingenuity will go a long way to solve most transportation problems.

The infrastructure of Cambodia is especially weak from our point of entry (Sihanoukville) to the test area (approximately 600 km) and another 80 km to the operational site. The vehicle made the trip to the test area mostly on board a trailer and by rail. The critical parts of the roadway and undersized bridges were by passed through use of the Cambodian railway and by driving the vehicle under its own power. RHINO traveled some 140 km of the trip at about 4 km per hour. The tiller unit, which weighs 14 tons but is easy to remove, was replaced by the dozer blade. As a result, the trip was made without damage to roadway and bridges. RHINO was able to tow a truck that had been stuck in the road and upright a huge truck, which had overturned because of overloading and very large potholes in the road.

■ RHINO bogged down before self-recovery.

Self-Recovery

RHINO was bogged down twice in muddy, swampy terrain. Two methods of self recovery were:

- In the first case, the vehicle was bogged down in a mine-infested area. In accordance with regulatory procedures, two manual deminers had to clear the surrounding area before the recovery work could commence. An anchor was built by means of a steel plate and long iron rods. A rope was fixed on the anchor as well as on an iron bar, which was fixed to the track plates at the rear of each track. With this arrangement RHINO was able to tow itself out of the mud.
- In the second case, the tiller unit was forced downwards in the ground to elevate the system while the rear of RHINO track formed the second base of the vehicle. Stones and wooden blocks were placed underneath to provide RHINO with traction to allow it to be driven out of the mud.

Operation in a Tropical Environment

RHINO was designed to operate in a tropical environment, so the high temperature and humidity, dust and very heavy rain in Cambodia did not have an adverse impact on it. RHINO proved its ability to work through huge termite hills as well as dense vegetation including any kind of bamboo. Trees up to 20 cm in diameter were processed by RHINO. All materials are ground between the two tilling drums. Some of the vegetation was worse than anticipated, almost inaccessible due to thick vines and trees up to 30 cm in diameter. RHINO was slowed down but not stopped. The grinding process continued. While our customer in Croatia clears 20,000 m^2 per day, RHINO was able to clear 4,000-6,000 m^2 per day in a very challenging environment. This is significantly more than a platoon of manual deminers can clear in a week. We learned that RHINO's level feelers, which control the clearing depth, needed stronger protection for driving in reverse in such a challenging environment as Cambodia.

Quality Rate

The situation in Cambodia confirmed the operational results of our customer in Croatia who has cleared some 2 million m^2 in just over a year without a single mine found intact in the treated soil. PMN mines without boosters were used in the Cambodian test to get information regarding the size of residuals of mines, which could not detonate. All mines treated during the special test were destroyed completely. All parts in the treated soil are passed through the small gap between the rotating drums. After successful completion of the test, CMAC's Risk Assessment Committee agreed to place the system into operation.

After RHINO cleared the first area, the area was checked completely by manual deminers in accordance with regulatory procedures. As a result of this first recheck and test results, the manual recheck was reduced by 50 percent. Only harmless mine residuals and fragments were found by the manual deminers.

Survivability

RHINO got a chance to demonstrate its survivability characteristics early in the severe conditions in Cambodia. During the first week of operation, a booby trap consisting of two AT mines detonated at approximately 30 cm under RHINO's left track. Later, a single AT mine detonated between the two tiller drums near the bearings, and another AT mine detonated under RHINO's right track. In less than two days, the detonations from the single mines were repaired in the field by the CMAC maintenance personnel. The double mine explosion caused more severe damage to mechanical parts and was repaired in the field in about a week.

There was no threat to human life with these explosions because RHINO is unmanned and remote controlled. An operator sitting in the cab of any manned clearing system would have been severely injured or killed by the double mine explosion.

Too Costly to Operate?

RHINO's deployment in Cambodia has demonstrated that if the system is used as intended and is operated in a day-to-day demining operation, its clearance speed is outstanding. Our cost study can demonstrate the cost effectiveness of RHINO when compared to a manual demining operation. RHINO is superior in that it:

- can be operated and maintained by indigenous personnel after a qualified training on the job.
- can be transported without damaging the infrastructure, even under the conditions of a developing country, by smart and flexible use of the available resources.
- disposes of sufficient self recovery means even in real swampy ground.
- is working reliably also in tropical environment.
- is one of the first reliable demining machines, which is much more efficient than manual deminers , and which makes manual rechecking of the ground unnecessary.
- has an outstanding survivability against AT mines, UXO and booby traps and offers excellent safety due to its remotely controlled operation.
- will speed up the demining process and reduce the costs per cleared square meter.

■ RHINO and crew emerge from typically dense vegetation found in Cambodian mine fields.

Conclusion

RHINO is a real demining machine. In the Cambodian operation, it has proven to be both safe and cost effective. If the world is going to make serious progress in solving its mine problem in a reasonable time frame, cost effective and efficient demining systems such as RHINO must be part of the solution.

The crucial requirements to use RHINO are an open mind, good planning, logistic as well as site management, and the international will to set up a long lasting demining project with multinational sponsorship. ■

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All photos courtesy of the author.

Cambodia: A Country Profile

Through the efforts of CMAC, Mines Advisory Group and HALO Trust, Cambodia is working to eliminate the hundreds of contaminated areas within its borders. Rohan Maxwell proposes changes in these operations to sustain removal efforts.

By Rohan Maxwell, *Officer, Canadian Army*

Background

In the late 1960s, communist insurgents known as the Khmer Rouge began operations against the central government of Cambodia, launching three decades of nearly continuous warfare. Vietnamese communists supported the insurgents, while the government came to be supported by the United States and South Vietnam. The fighting was exacerbated by the expansion of the Vietnam War into eastern Cambodia, including a massive American bombing campaign against communist supply lines. Battlefield UXO was widely dispersed, while aerial-delivered UXO was concentrated in the eastern and central provinces (ref 1). According to the International Committee of the Red Cross (ICRC) (ref 2), about 10 percent of the mines in Cambodia were laid during this period—most in the central and southern provinces.

The first civil war ended with the defeat of the central government in April 1975. It was followed by 44 horrific months of Khmer Rouge rule, during which more than 1 million Cambodians died of starvation, disease and murder. Approximately 5 percent of the mines were laid under the Khmer Rouge regime, mainly in the Thai and Vietnamese border regions.

The second civil war began at the end of 1978 when Vietnam, goaded by border provocations, drove its erstwhile ally back into guerilla warfare and installed a more cooperative government led by Khmer Rouge defectors. After a decade of fighting between the central government (and its Vietnamese backers) and the Khmer Rouge (and various non-communist Cambodian groups formerly opposed to them), Vietnam withdrew its forces and peace negotiations began. With the concurrence of all parties, the U.N. Transitional Authority in Cambodia (UNTAC) was mandated to run Cambodia for 18 months (1992-1993) in order to supervise demobilization and conduct elections. The Khmer Rouge chose to resume fighting, so demobilization failed, but elections did take place and the central government gained greater international legitimacy. The war continued for the remainder of the 1990s, with the central government slowly gaining the upper hand and internal and external support for the guerillas ebbed. Most of the fighting took place in the northern and northwestern provinces, but there was also significant fighting in the central and southern provinces. By the late 1990s, the guerillas were a spent force and the last groups gave up in 1999.

The majority of the mines, 85 percent, were laid during the second civil war. All combatants used mines extensively, and, ironically, the highly mine-affected Cambodian civilians began using them for their own purposes—self-defense, protection of property, or brutally direct dispute resolution. Few records were kept, but in 1994 the United Nations estimated that there were as many as 10 million mines in Cambodia (ref 2). In 1997, this was reduced to 4 million to 6 million (ref 2), an estimate supported by the number of mines that were actually being located (ref 3). In 1999, the HALO Trust took this empirical approach one step further, applying the known clearance results to the amount of land thought to still be contaminated: this estimate suggested that there had been no more than 1 million mines to begin with (ref 2).

A bridge along National Route 10, the main highway connecting Cambodia's second-largest city, Battambang, to Thailand. *c/o Rohan Maxwell*

UNTAC identified more than 1,900 potentially contaminated areas (ref 3) totaling approximately 3,600 square kilometers (refs 2 and 3). By 1999, subsequent survey efforts had reduced this to 2,800 sq. km (ref 3). Of this total, 656 sq. km were known to be contaminated (ref 4), leaving 2,144 sq. km in doubt. Since on average only 35 percent of suspected terrain is actually mined (ref 2), it is probable that a further 750 sq. km of contaminated land will be identified, for a total of approximately 1,400 sq. km. This total will require a significant amount of clearance, since on average each square kilometer of contaminated land contains more than 1,000 mines.

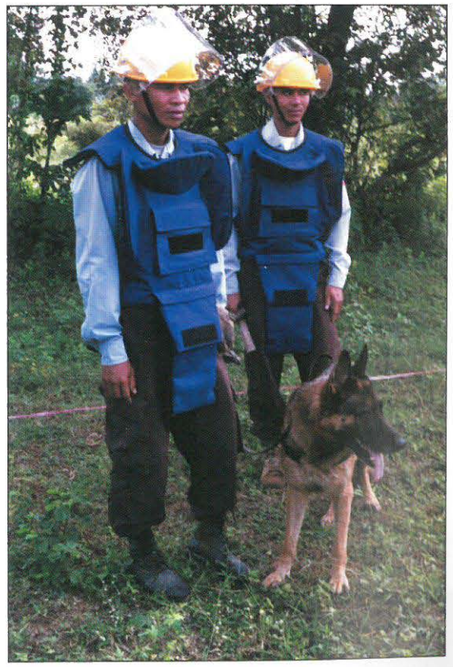
In 1993, the UNTAC force commander estimated that it would take 30 to 40 years to demine Cambodia (ref 5). In fact, given the current clearance rate of approximately 15 sq. km per year (ref 2), it would take 93 years to clear 1,400 sq. km. If only high priority land is considered—land needed for resettlement, agriculture and critical development—the task becomes more manageable. For example, the HALO Trust estimates that all high-priority land in Cambodia could be cleared in five to 10 years at the current rate of progress (ref 2). This estimate depends on the definition of high-priority land, but the key point is that with continued international assistance it should be possible for most Cambodians to live a mine-free existence within a reasonable period of time. Once that has been accomplished, a smaller-scale, long-term effort can deal with the remaining areas.

The Mines

Of all mines in Cambodia, 99 percent are AP: 68 percent blast, 26 percent fragmentation, and 5 percent bounding fragmentation. The Russian PMN-2, whose 115-gram charges inflict great damage, accounts for approximately 80 percent of the blast mines. Smaller blast mines include the Vietnamese MD 82B and MN 79, the Russian PMD-6 and the very low metal content Chinese Type 72A and B (the B model incorporates an anti-disturbance device). Most fragmentation mines are Russian POMZ-2 or POMZ-2Ms, while the Chinese Type 69 is the bounding fragmentation mine of choice. AT mines are almost all Russian; many of them are buried in stacks of two or three more than a meter down with a bamboo pole to conduct pressure from the surface to an AP mine placed atop the first AT mine (refs 3 and 4).

Casualties

In 1994, Handicap International determined from the number of mine-related amputations per month that there were approximately 500 casualties per month from 1985-1994, or a total of 60,000 casualties (ref 5). In contrast, a 1998 estimate by the U.S. government gives a smaller figure of 37,428 casualties for the longer period of 1979-1996, including 13,328 fatalities (ref 1). The most comprehensive and recent information is that gathered by the Cambodian Mine Incident Database. This source provides a figure of 48,842 mine and UXO casualties from 1979 to the present (ref 8). Adding 15 percent for pre-1979 casualties (based on the proportion of mines laid before 1979) increases this to perhaps 56,168 casualties since the fighting began, as many as 28 percent of which may have been fatal (15,727 deaths—refs 1 and 8). This is by no means a worst-case analysis—at present a majority of the estimated 49,846 Cambodian amputees (ref 1) are casualties of mines and UXO. As amputations represent 27 to 40 percent of all injuries (refs 5 and 8), there could have been as many as 124,615 to 183,281 casualties. Discrepancies on such a large scale are difficult to fathom until one recalls that a much larger figure—the number who died under the Khmer Rouge—has not yet been narrowed down to the nearest million.



A mine detecting team ready for the mine field. *c/o Rohan Maxwell*

The Mine Incident Database provides excellent detail on the current situation. At present, 91 percent of casualties are civilians, 38 percent of whom are injured in the course of subsistence activities such as farming, gathering wood, fishing, collecting food, fetching water and herding cattle. An additional 15 percent are injured while travelling. Adult males

account for 63 percent of all victims, but 30 percent are children under the age of 18. Tampering causes 42 percent of casualties, including one-quarter of the men, three-quarters of the children and one-quarter of the women. Most of them fall victim to mines, but UXO accounts for 41 percent of all casualties, including 69 percent of children. There are, on average, 85 new victims each month, and 1 in 5 do not survive their injuries.

Demining Organizations

There are many humanitarian organizations that have conducted, supported or are presently contributing to demining operations in Cambodia (e.g. Norwegian People's Aid (NPA), Handicap International (HI), World Vision, CARE) but this article will discuss only those that are currently conducting operations: HALO Trust, Mines Advisory Group (MAG) and the Cambodian Mine Action Center (CMAC). HALO Trust has been working in the northwestern provinces of Banteay Meanchey and Siem Reap since October 1991. Its 500 Cambodian staff are organized into 16 clearance teams working predominantly in the immediate vicinity of villages—houses, schools, water supplies, health facilities and paddy fields. HALO's Cambodia operations are funded by the governments of the United Kingdom, the United States, Finland, Ireland and Japan, as well as the United Nations, the European Union (EU) and private donors in England and Japan. MAG Cambodia started work in 1992. Its mine action teams are presently concentrated in the northern and northwestern provinces of Preah Vihar and Battambang. Like the HALO teams, they normally work in proximity to villages. The 389 Cambodian staff (including 48 amputees and 46 woman deminers) and nine expatriates are supported by donors including the governments of the United Kingdom, the United States and Austria, as well as the Lutheran World Service and Church World Services.

CMAC evolved from the UNTAC Mine Clearance Training Unit in 1993. After initial funding difficulties, it expanded to a strength of 2,800 Cambodian staff and 50 expatriates. CMAC is a Cambodian agency, but it relies almost entirely on international donations and it is administered as a project of the U.N. Development Programme. Its annual budget has peaked at approximately $12 million (U.S.), plus numerous donations in kind from donors including Australia, Belgium, Canada, Denmark, Germany, Japan, the Netherlands, New Zealand, Norway, Sweden, Switzerland, the EU, the United Kingdom and the United States.

CMAC's approximate 60 demining platoons are organized and deployed in groups of four to six platoons plus supporting elements (ambulance, radio, guards, etc.), with three such groups making up a Demining Unit (DU). This type of organization means that CMAC cannot deal readily with smaller tasks. Some flexibility is provided by community mine teams whose mandate is to take on urgent tasks in order to reduce casualties as quickly as possible. Ideally, these teams clear the most critical areas in a village and mark the remaining mined areas until CMAC can mount a larger operation. There is also a small development demining unit that has carried out a number of high priority tasks with funding directly from UNHCR. CMAC also deploys EOD, mine awareness and mine marking teams.

From1993 to 2000, CMAC's platoons cleared an average of 10 sq. km per year. In mid-2000, three of the four DUs were working in the northwestern provinces of Battambang and Banteay Meanchey and the fourth was preparing to move into northern Cambodia. Unfortunately, CMAC had failed to adequately address a multitude of concerns about mismanagement and corruption, despite increasing donor pressure beginning in 1999. As a result, funding became steadily scarcer and after scraping by for several months, CMAC ceased operations and laid off the majority of its staff in late 2000. This effectively removed three-quarters of the demining resources in Cambodia. Currently, it appears that CMAC will resume operations at some point in 2001, once donor concerns have been fully addressed and funding reinstated. Meanwhile, several commercial demining companies are currently seeking to benefit, in part, from CMAC's failings and receive the authority to begin demining operations.

Billboard depicting a cooperative project of CARE, the World Food Programme and CMAC. *c/o Rohan Maxwell*

The Planning Process

In theory, demining efforts should be preceded by a systematic Level 1 Survey. Unfortunately, the security situation in Cambodia precluded such a survey until the late 1990s, and as a result the most comprehensive data was that collected by UNTAC and refined by CMAC. Planning was further complicated by the fact that many of the most afflicted areas were not accessible to demining organizations for security reasons. This meant that demining efforts were frequently directed at areas that were accessible, but not necessarily high priority. Now that security levels have improved, the planning process is slowly being refined. In concept, the provincial governments should set demining requirements and priorities. Where appropriate, NGOs and international organizations working in the province must also be involved in the planning process, as they normally provide the resources needed to put the demined land to best use. Demining agencies should provide technical advice—what can be done, and when it can be done—but they should not set priorities. This concept places responsibility for land use where it belongs. Cambodian political structure at the provincial level includes the provincial governor and government, the subordinate district chiefs, the commune chiefs of each district and the village chiefs of each commune. The Provincial Rural Development committee recommending demining priorities to the governor, but the detailed work is carried out by the Land Use Planning Unit (LUPU). Each district has a District Working Group (DWG) which submits its demining requirements and priorities to the LUPU (and then to the PRDC) based on input from the commune chiefs (who have in turn consulted their village chiefs). The PRDC then coordinates with the demining agencies to match resources to tasks, and the result should be a fully coordinated demining and development plan.

This process is still being developed. The key is to ensure that planners and staff at all levels develop the required level of technical expertise—for example, the use of Geographical Information Systems (GIS)—as well as management, organizational and planning skills. In Cambodia, where the Khmer Rouge did its best to eliminate those who possessed such skills, planning and organizational structures are being rebuilt very nearly from scratch, and it will be some time before the concept outlined above can be completely implemented. Land titling must also become more reliable if demined land is to be put to its intended use. Finally, accurate survey data is still required, and to this end a national Level 1 Survey has finally been initiated, with funding from the Canadian government.

National coordination between the demining agencies was until recently a CMAC responsibility. However, the agencies did not normally work in proximity to each other, and CMAC and the demining NGOs normally concentrated on different types of tasks. There was little call for coordination in the field and, for planning purposes, MAG and HALO worked closely with selected communities and agencies, while the task of working with the provincial governments fell largely to CMAC. In 2000, as part of the response to the CMAC crisis, a national demining authority was created. The Cambodian Mine Action Authority is developing policies to regulate the operation of commercial demining companies and to conduct quality assurance checks on all demining agencies. Its secretary general envisions the commercial companies undertaking mine clearance tasks unsuitable for humanitarian organizations. It is anticipated that the first such operation will be officially licensed in March.

A cluster of three PMN-2s, Cambodia's most ubiquitous mine. *c/o Rohan Maxwell*

Demining Operations

Manual demining is the primary method in use in Cambodia. The equipment is typical for the job (tripwire feelers, vegetation cutters, mine detectors, prodders and excavating tools, varying suites of protective equipment), as are the physically and mentally arduous conditions deminers face daily. Rates of pay are high by Cambodian standards: $160 a month for a beginner CMAC deminer, in a country where the per capita monthly income is about $23. These wages and

Mine field clearance operation showing typical vegetation cover.
c/o Rohan Maxwell

the status associated with being a deminer are more than sufficient to overcome any concern about death or injury, and there is no shortage of volunteers. There has been a steady trickle of casualties among the demining and EOD teams, averaging eight or nine a year since 1993, about 7 percent of which are fatal. The variety of soil conditions across the country—in particular, the large areas in which the soil contains a high natural metal content—presents a significant challenge, which in CMAC's case has been partially addressed by deploying two different mine detectors. Another challenge is the high level of metal contamination in many areas—not just on old battlefields, which can be expected to contain a great many metal fragments, but also on the sites of abandoned villages that are now being resettled. Ten miniscule fragments per square meter is not uncommon, and even the most experienced deminer cannot differentiate between the signal produced by such a fragment and that produced by a low metal content mine.

In addition to the manual deminers, there are a number of mechanical systems that are either in service or under evaluation. These systems fall into two categories: those designed to accelerate the manual demining process by removing vegetation (and tripwires); and those intended to demine on their own, with the support of a small number of manual deminers. Vegetation cutters are well suited to the Cambodian situation, where the removal of vegetation and checking for tripwires consumes up to 70 percent of the deminers' time (ref 3). HALO Trust has successfully deployed seven tractor-mounted vegetation cutters in support of its 16 clearance teams. MAG is currently conducting trials on the Pearson Tractor, a multi-functional system that can be adapted to clear vegetation, cut small trees, and conduct area reduction and quality assurance tasks. The Tempest is a remote-controlled mini-flail, which is also being evaluated by MAG for vegetation clearance. This machine is unusual in that it was built in Cambodia by a British charity that employs disabled Cambodians. Finally, CMAC is testing Japanese vegetation cutting systems that are essentially tracked excavators with brushcutters in place of the excavator buckets.

The mechanical vegetation cutters described above are either operational or show promise; in contrast, the two mechanical demining systems that have been evaluated (both by CMAC) have enjoyed less success. The first is the Sisu RA-140 flail, originally designed to clear scatterable mines from hard surfaces or standard mines from open terrain. After extensive trials, it has been concluded that this system cannot clear terrain to meet required standards. Only about 80 percent of the mines (at depths of 5 to 20 cm) are detonated or rendered inoperable, and there is a significant risk that some mines could be thrown out of the mine field into previously safe areas. In addition, the system lacks mobility. The Finnish government, though, remains willing to underwrite the costs of deploying and operating two systems, so CMAC uses them as vegetation cutters. They enjoy reasonable success in this role, particularly against thick bamboo, but they continue to encounter mobility problems.

The second system is RHINO, a tracked vehicle equipped with two heavy counter-rotating drums mounted laterally, one above the other, on the front of the chassis. This adapted agricultural system is designed to till the soil to a depth of 20 cm, crushing all mines and UXO between the drums. At a weight of 48 tons (without the 14 ton tiller unit attached), it was very difficult to deploy RHINO to task sites during its trials. Cranes and flatbed trailers of the required capacity are not easily procured in rural Cambodia, and it was sometimes necessary to make route improvements in order to move the system. Once on site, the machine worked reasonably well when difficulties with depth maintenance had been resolved. A small number of manual deminers dealt with awkward spots and provided a measure of quality assurance.

After its initial evaluation, RHINO did valuable work in support of a multi-village rehabilitation project under the aegis of CARE Cambodia. The drums survived mine and UXO detonations, but on a number of occasions AT mine detonations rendered the system inoperable for significant periods of time. Spare parts were an ongoing concern, because most of them had to be shipped from Germany. Most critically, RHINO was expensive to operate. This can be more than made up by the savings in manual demining costs, but only if the system can be deployed in a series of very large, open mine fields in close proximity to each other. This was not the case in Cambodia, and once the funding provided by the German government ran out, RHINO returned to Germany.

Finally, CMAC is developing a mine detecting dog (MDD) capability, funded by the Swedish government. The intent is to use MDDs for area reduction and possibly for quality assurance, but the training and deployment process has been a lengthy one. The project began in 1996, but there was a significant initial setback when Cambodian dogs taken to Sweden for training proved unsuitable for the task, necessitating a fresh start using Swedish dogs trained in Cambodia. These dogs and their Cambodian handlers moved from their training facility to Battambang province in early 2000. The intent was to familiarize the teams with the terrain before starting area reduction tasks in the spring of 2000, but this took longer than anticipated and as of mid-2000 there were no operational teams.

Conclusion

Cambodia remains a heavily mine and UXO-contaminated country with an extremely high rate of related casualties. Humanitarian demining will remain a high priority for at least another decade, and while the demining NGOs can probably be relied upon to stay the course and successfully nationalize their operations, the capability lost by the CMAC suspension must be replaced. There are various options— retain CMAC, create several smaller organizations, divert funding to NGOs—but they all require continued international support. Unfortunately, the recent difficulties with CMAC have made many donors justifiably wary. The solution is not to reduce or withdraw funding, but rather to continue to insist on fundamental changes to the way in which demining funds are managed and demining operations are planned and conducted. ■

Rohan Maxwell is an officer in the Canadian Army with 13 years experience as a combat engineer, including mine and UXO clearance operations in Iraq and Kuwait. In 1999, he served as a technical advisor with CMAC.

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Munitions and Mines:
Peace Education for Laos

From the end of the Vietnam War to 1994, 10,000 Laotians fell casualty to the millions of pieces of UXO within their borders. The author recounts the role of Mennonite Central Commitee and other NGOs in reversing this situation.

By Titus Peachey, *Mennonite Central Committee*

It was 8:00 one morning in March of 1998, when Phou Vieng, a villager in the northern Lao province of Xieng Khouang, was preparing his work for the day. Having recently built a simple house for his family, his first task for the morning was to dig several shallow holes in the earthen floor to anchor his bed. After measuring and marking the places where his bedposts would lodge, he prepared his digging tool and squatted beside the first mark. In one short stroke, his life was forever changed.

All Phou Vieng can remember is the sound of the explosion. Hundreds of shards of steel tore into his body from a cluster bomb buried just beneath the soil. One of the pieces of shrapnel punctured a nearby can of gasoline, and it burst into flames. Fortunately, neighbors gathered quickly and carried Phou Vieng to safety, but his house and all the family's belongings were burned.

The bomblet in Phou Vieng's house was dropped as part of a massive U.S. bombing campaign that flew more than 580,000 missions over Laos between 1964 and 1973. This equals roughly one mission for every five inhabitants of the country and an average of one bombing mission every eight minutes around the clock during the entire nine years. Researchers estimate that approximately 90 million submunitions were dropped during the bombing campaign. With a dud rate of 10-30 percent, well over 9 million pieces of UXO were left behind. This ordnance, much of it cluster munitions, has now lain in the ground for over 25 years and becomes less stable and more dangerous with each passing year.

When the war ended, hundreds of thousands of Lao villagers who had fled the bombing returned to their homes. In most cases, everything had been destroyed. They had to rebuild their homes, repair the paddy dikes in their rice fields, and open up the soil with shovels and hoes. They carried on this intensive work in the midst of a staggering array of still-lethal UXO littering the soil. Unknown to them, their villages and surrounding fields had become one vast, unmarked mine field. With no one to help them, these villagers were trapped. In 1994, I asked one villager why he continued to grow vegetables in a location with bomblets, or "bombies" as they are often called. He responded, "I can't move my garden. There wouldn't be any point to it anyway. If I moved it to a new location, I'd just find more bombies there. So I might as well keep it where it is."

Thongsavanh, a teacher in Xieng Khouang province during the war years, remembers instructing his students to pick up the strange round pieces of ordnance that appeared in the forests and hillsides near his school. "I didn't know it was dangerous," he recalled. "I thought since the bombies hadn't blown up on impact they weren't dangerous anymore."

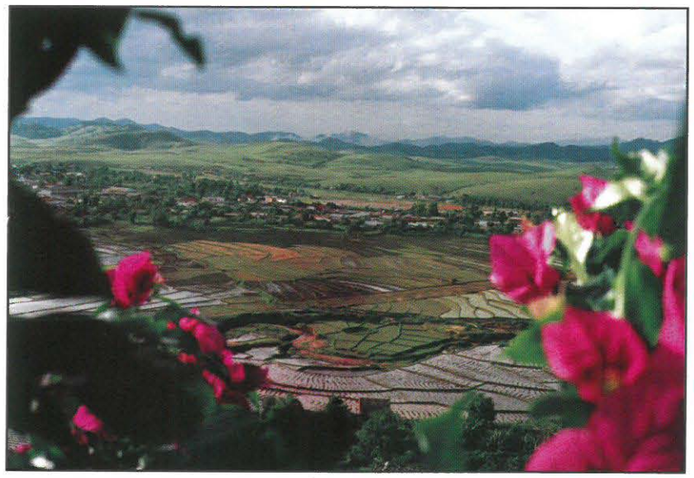
Typically, when villagers found ordnance in their fields and gardens, they simply removed it with their bare hands. They found within themselves a courage borne out of necessity. Farming was their livelihood and the only land available to them was filled with bombs. Indeed, with the passage of time, villagers became almost casual in their approach to the ever-present bomblets. An encounter I had with Thong Dee, who was plowing his field in Lek Village, illustrates this attitude. When I asked Thong if any bomblets had been turned up during the plowing thus far, he matter-of-factly replied that over 20 had been plowed up the previous day. He had thrown or placed some of the bomblets into a hole at the edge of the plowed field. As I walked over to the hole and peered over the edge, Thong hurriedly pulled away the weeds and scrap metal he had placed on top to reveal the four or five bomblets underneath. Noticing that I was about to take a picture, he quickly moved each bomblet into clearer view, handling them like they were merely billiard balls.

Sadly, not everyone was as lucky as Thong Dee. Between the end of the war in 1975 and the beginning of clearance operations in 1994, more than 10,000 Lao villagers suffered injury or death from UXO. In many ways, the stories are remarkably similar to the stories of accidents from landmines. People are injured or killed during their everyday activities such as collecting firewood, herding cattle or hoeing in their fields and gardens.

Because of their curious shapes and colors, and because many of them can be found easily accessible on top of the soil, cluster munitions are almost irresistible to children. In fact, over 25 percent of UXO-related casualties happen to children, none of whom were born when the bombs fell. On Nov. 22, 1993, four Tu Va Chao children were walking along a street on the edge of Phonsavanh, Xieng Khouang province's capital. They were taking the water buffalo to pasture when Kou Ya, four, and Sia Ya, six, noticed a round object in the ditch. It looked like the ball boys and girls toss to each other during Hmong New Year festivities. It was actually a cluster bomb. Sia Ya threw it to her brother. He couldn't catch it and it landed behind him, exploding and killing him instantly. Sia Ya died after two agonizing days and nights in the provincial hospital.

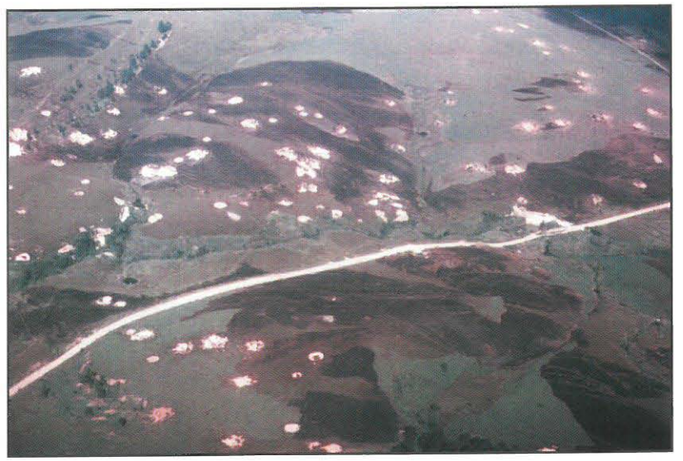
The story of the Chao children illustrates yet another tragic aspect of cluster bomb explosions. Compared to landmines, cluster bombs have higher explosive power and deadly fragmentation effects. They are designed to kill. In Laos, 52 percent of all UXO accidents have resulted in death.

In the period immediately after the war, the Soviet Union assisted with the clearance of a large state farm in Xieng Khouang province. Aside from this effort, the only assistance came from two North American NGOs: the



Phonsavanh, the capital of Xieng Khouang province, is situated on a high rolling plateau. *c/o MCC U.S.*

Mrs. Chao and surviving children. *c/o MCC U.S.*



Bomb craters in Xieng Khaouang province. *c/o MCC U.S.*

Mines Advisory Group technician searching for UXO.
c/o MCC U.S.

Mennonite Central Committee (MCC) and the American Friends Service Committee. These groups imported good-quality shovels for agricultural use. Shovels were thought to be somewhat safer to use than the traditional Lao hoe, which was swung from high over the head to turn the soil. Shovels were gentler and perhaps less likely to detonate a hidden bomblet. There were other experiments in these early years, such as an MCC-supplied armored tractor with a chain flail device on the front. These experiments proved ineffective and were eventually abandoned.

However, in 1994 the MCC, the Mines Advisory Group (MAG) and the Lao government initiated a UXO clearance project. The project quickly drew the attention of U.N. agencies and other governments. As funding became available, the project grew. From 1996-1998, over 122,000 pieces of UXO were cleared; approximately 50-75 percent of UXO cleared were cluster bombs.[1] By the year 2000, eight international partners, in cooperation with the Lao government and local partners, were clearing UXO in nine of the country's 18 provinces and educating local people to the dangers of UXO.

As MAG began working in Xieng Khouang province, Laos, the newly trained clearance teams encountered a curious problem. Each morning, when they arrived at the work site they discovered, resting on top of the soil, new cluster bombs that had not been there the day before. The work site was a large open area that was the future site of a teacher's training college. A conversation with the villagers across the road from the worksite cleared up the mystery.

It seems the villagers, who were aware that cluster bombs were being destroyed each day, decided to carry cluster bombs from their village to the clearance site each evening. In this way, the bomblets from their village could be destroyed, even though their village had not been chosen for clearance. This action by the villagers, while extremely risky, also made a clear statement about the presence of UXO in the vast affected areas of Laos. UXO is everywhere, and clearance teams can only begin to create tiny islands of safety in a great sea of ordnance.

MAG and its counterparts in the Lao government responded quickly to this action by the villagers. Rather than putting all their resources into the sub-surface clearance of a piece of land, which would take months to clear, they split the team in two. One team remained to clear the site of the future school, while the other team traveled from village to village to destroy bomblets on the surface posing an immediate threat to life and safety.

Roving teams continue to destroy bomblets on the surface but do not make the ground safe for agricultural use. The benefit of a roving team is the immediate reduction in risk, especially to children who are often attracted to the toy-like appearance of bomblets. Over a period of time, however, the Lao roving teams discovered that they could be called back to the same area repeatedly. Bomblets that bury themselves on impact often work their way to the surface as time passes. Through the natural expansion and contraction of the soil and erosion, new bomblets appear where none could be seen before.

In May 2000, I accompanied a film crew to Laos to help produce a documentary that will be shown on public television. I watched as a bomb clearance team prepared to blow up nine bomblets that had been found on a hillside used for grazing cattle. As the team worked, my colleagues and I spotted four more bomblets on the hillside. The metal shells of the bomblets had just begun to appear above the soil. This area had been cleared before and will certainly have to be cleared again.

April 2001 will mark the seventh anniversary of the beginning of systematic UXO clearance in Laos. Tremendous progress has been made since the first team of 20 clearance specialists was trained in 1994. Hopefully, all the destroyed ordnance has resulted in some reduced risk and some tragedies have been avoided. It is gratifying to see these developments.

Despite all this work, there has been little reduction in the rates of injury and death. Casualties still occur at the rate of about one accident every two days. As the Lao population grows and the pressure on the land increases, new areas will have to be opened up for agricultural production and settlement. Much of this land will present a serious UXO problem. Ordnance clearance work will have to continue in Laos for decades.

MCC's 25 years of history in Laos and ongoing struggle with the problem of UXO has led it into the arena of advocacy. As a people of faith committed to peace and non-violence, we could not visit with families who had experienced painful losses from cluster munitions without asking the larger questions about why and how cluster munitions are used. As we researched the continued production and use of cluster munitions in numerous conflicts around the globe, we became convinced that serious problems exist related to targeting, the size of cluster bomb footprints and dud rates.

MCC has joined other agencies in issuing a Call for a Moratorium on the production and use of cluster munitions. As a result of our work in Laos and our exposure to the UXO problem on the civilian population in post-war Iraq and Kosovo, MCC believes it is time for the international community to ban these weapons. ■

U.S. bomb on display in front of a home in Phonsavanh, Xieng Khouang.
c/o MCC U.S.

Over the past 35 years, in places like Vietnam, Laos, Cambodia, Sudan, Yugoslavia, Iraq, Kuwait, Kosovo, Chechnya, Eritrea, Ethiopia and Afghanistan, cluster munitions have had a persistent and tragic record of indiscriminate killing. During Operation Desert Storm, at least 25 U.S. military personnel were killed by U.S. submunitions, and other U.S. personnel were injured. Cluster munitions are an increasingly significant obstacle in various peacekeeping operations.

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WHAT ARE CLUSTER MUNITIONS?

Cluster munitions are small bomblets or submunitions which are delivered to their targets in large containers or shells. The container opens in mid-air over the target area, often dispersing the bomblets over an area the size of several football fields. A drop of several cannisters can easily create kill zones of a square kilometer or greater in size.

The bomblets may be the size and shape of a lawn dart, or an elongated soda can, and are designed to explode on or shortly after impact. The AP bomblets have fragmentation features which can send hundreds of shards of steel at ballistic speeds over a wide area. Anti-armor bombs have shaped charges which can penetrate heavy armor. The cluster munitions are delivered in a bomb by aircraft, or launched by rocket or artillery projectile.

WHAT'S THE DIFFERENCE BETWEEN A LANDMINE AND A CLUSTER MUNITION?

The primary difference between cluster munitions and landmines is in their design.

Cluster munitions are designed to explode as a result of their impact, so that their effect is felt within a short time of their delivery. Landmines are designed to explode as a result of contact with or proximity to a person. By design, their effects may be felt many months after their placement, depending on when a person initiates contact with the landmine.

Cluster munitions which fail to explode on impact, however, are very similar in effect to landmines.

Since dud rates for cluster munitions are often in the 10 percent-30 percent range, most cluster munition strikes create the actual effect of a mine field.

The Journal of Conventional Weapons Destruction, Vol. 5, Iss. 1 [2001], Art. 1

Mine Detection Dogs At Work

The Journal profiles mine dog companies ranging from South Africa's Mechem Engineering Services to the United State's RONCO Consulting Corporation in Washington D.C.

By Stacy L. Smith, *MAIC*

History of War and Mine Detection Dogs

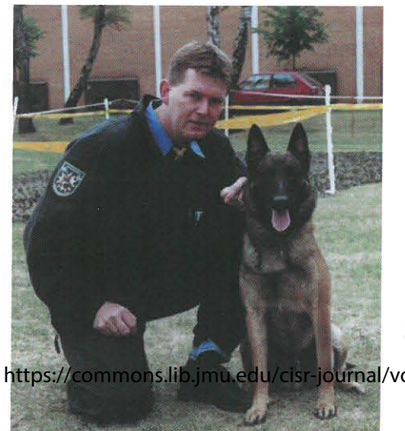
Through extensive training in scouting, detection, and search and rescue (SAR), military working dogs have proven to be valuable assets to the defense and safety of many countries.

Since World War II, the U.S. military has deployed over 30,000 dogs in the aid of soldiers. In 1943, the Germans attempted to deter Allied troops from North Africa by placing nonmetallic mines in the ground. The British quickly found a method for counteracting the Germans' strategic move with the help of "M-dogs" trained to detect mines encased in plastic or wood. The United States soon followed with the implementation of a mine dog detection program with over 100 dogs and 120 handlers assigned to a mine detection unit under the 228th Engineer Mine Detection Company at the Cat Island Dog Center (Lemish). Deployed in 1944, the dogs were initially unsuccessful in locating mines in Algeria and Italy. Key factors included a lack of training to prepare the dogs for loud sounds such as artillery or small-arms fire.

"Like other crash programs instituted during the war, the M-dog program was hastily conceived without sufficient background knowledge to implement the program—finding bones is entirely different from locating an explosive mine" (Lemish).

U.S. efforts to maintain the mine dog detection program did not resurface again until the Vietnam War. After conducting a feasibility study in 1967, the U.S. Army Limited Warfare Laboratory (USALWL) determined that improved training methods and advanced techniques would resolve problems occurring during mine detection dog (MDD) deployment in World War II. Instead of using fear motivation or food rewards to promote successful detection, the USALWL elected to use positive reinforcement. As a result, MDDs performed at a high success rate in Vietnam, locating mines, trip wires and booby traps.

Weitkamp and his German Shepard in front of M-Detect's training facility in Ascheberg, Germany. *c/o Weitkamp*



Mine Detection Dogs Today

Today, MDDs are used worldwide in mine-afflicted countries to locate and detect UXO/landmines remaining from internal and external conflicts. After intensive training, MDDs are able to assist in demining and clearance efforts efficiently and effectively with a proven success rate. Following is a brief description of companies and organizations specializing in MDD training and deployment.

Mechem Engineering Services

In South Africa, Mechem, a local company and division of Denel's Systems Group, is clearing much of the country's mine-infested areas. Mechem uses the latest demining technology to remove mines inexpensively and efficiently.

MDDs are used in the Mechem Explosive and Drug Detection System (Medds). The system uses vapor concentrations and the nasal sensitivity of demining dogs to uncover traces of chemicals from explosives. This system can be used for detecting both metallic and non-metallic explosive devices.

In March 2001, Mechem will begin demining operations in Mozambique with a crew of 16 men and eight MDDs. The crew will work towards locating and removing approximately 2 million mines left over from internal conflicts between the Frelimo government and Renamo rebels. Operations are expected to last until October 2001.

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Swedish Armed Forces Dog Instruction Center

The Swedish Armed Forces Dog Instruction Center trains dogs specifically for the situation in which they will perform. For example, dogs needed to rescue personnel from mine field accidents in Bosnia are trained for conditions and situations they are likely to encounter in the country.

MDDs from the Swedish Armed Forces Dog Instruction Center are currently working in Cambodia, Kuwait, Lebanon, and the Western Sahara. Operations are often accomplished in collaboration with local mine action organizations who provide background information and region-specific project details. In cooperation with the Cambodian Mine Action Center (CMAC), MDDs have been very successful in eliminating the dangers of UXO/landmines found in Cambodian mine fields.

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An MDD surveys the landscape. *c/o Martin Weitkamp*

Humanity Dog

Since the 1940s, Humanity Dog has trained MDDs in order to aid humanitarian demining efforts. Each year approximately 100 dogs are trained and deployed to locate and identify landmines, mercury, PCB and drugs. Demining dogs trained by Humanity Dog can detect mines at depths of 50 cm, in paths 2-3 cm wide and in low-level concentrations.

MDDs undergo rigorous training in scent analysis. Trained dogs can detect both single substances and combinations of substances used to create landmines.

Training is conducted for both dogs and dog handlers through the Mine Detection Dog Handler Training Programme. Dogs and dog handlers are paired and taught together to ensure a working relationship between each team. MDDs are required to complete 15 months of basic training and 12 months of specialized training before taking a comprehensive exam for fieldwork eligibility. During specialized training, MDDs also complete three weeks of training designed to acclimate MDDs to their new surroundings. Environmental training allows dogs to adjust to the density and smell of the soil. In addition, some dogs require two days of ground adaptation training in areas where the clearance soil fluctuates.

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RONCO Consulting Corporation

RONCO works under a U.S. Department of State Humanitarian Demining Program Office contract. RONCO's current mine detection initiatives that utilized MDDs include participation in the Mozambique Mine Detection Dog Program and the Thailand Mine Detecting Dog Center.

In addition, the RONCO Team assisted in an international effort after Hurricane Mitch wreaked havoc on Central America in 1998. In Central America, 12 teams comprised of six dogs and six dog handlers demined bridge abutments and river crossings.

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Police Dog Institute for Consultancy and Management

In 1995, the Police Dog Institute for Consultancy and Management (POLDICAM) began training dogs to combat and detect crime. Using the latest training techniques, POLDICAM trains dogs for deployment in detecting explosives, landmines and narcotics. In addition, POLDICAM also trains dogs for personal protection, patrol and apprehension, arson detection, crime prevention, and SAR.

According to POLDICAM director Stan Gillham, approximately 15 dogs are trained each year for mine detecting purposes. The dogs are carefully selected for drive and scent abilities, and POLDICAM uses imprinting to train MDDs to recognize scents specific to explosive devices or UXO.

Currently, POLDICAM has seven operating MDD teams consisting of a matched dog and handler. Most of these teams are working in Northern Mozambique, clearing fields at a rate of 10,000 sq. m per day. Gillham explains that mine detection teams like the ones trained at POLDICAM are "able to expedite area reduction for landmines" and work towards the goal of using "properly trained dogs as an important aid in policing."

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Global Training Academy

The Global Training Academy was founded in 1984 and specializes in training dogs to detect narcotics and explosives as well as assist in police patrol, tracking and SAR procedures. Global Training Academy director Dan Hayter said MDDs are a valuable asset to mine detection and removal. "The dogs' ability to cover a large amount of ground in a short period of time with great accuracy is a plus," he said, "[and]

continued on page 119

Comparative densities of mines and UXO in clearance operations in the region:

Region	Square meters	Mines/UXO removed	Square meters per mine/UXO
Koch Mine Safe	3,809,281	65,185	58
NPA, Songo, Cabora Bassa	738,180	12,072	61
Mechem, Massingir	89,634	349	467
Mechem, Corrunana Dam	1,700,000	3,600	472
Mozambican average			1,500 - 2,500

Source: Mechem, NPA Mozambique, Quarterly Report 4th Qtr, 1999, Koch-Mine Safe, IND, Maputo.

Working under extended hours, the mechanical team was capable of bringing the company up to between 6.5 to 7.5 million m^2 of land by February 2001. The Mine Collector processes 20,000 m^2 of ground per day, and the manual team covers around 12,000 to 12,500 m^2 per day, potentially destroying over 1,000 mines per day.

On average (over both mine fields), KMS's teams are lifting and destroying one mine per 58 m^2 of ground. In the Cordon Sanitaire mine field, this broad average rises to one mine per 20 m^2. The mechanical team working in the center of the Cordon Sanitaire clears one mine per 12 m^2 *on average*—spot densities can be more than double this figure.

Two things characterize the current clearance program:

• *The high density of mines and number of mines being cleared.* In June 2000, KMS cleared 421,000 m^2. By mid-July 2000, the team had cleared a total of 3,809,281 m^2 of land and 65,185 mines—one mine per 58 m^2. By any standards, the current safety record of KMS is exceptional considering the conditions.

• *No "missed mines" have been reported by BacTec, which assesses 10 percent of the land cleared.* The level of quality achieved under these conditions is very high. ■

"KMS was also strongly criticized for a high accident rate. From March to June 1999, 12 accidents occurred. Over half of the accidents were incurred during excavation. The primary cause of one-third of these was attributed to management error, notably serious injuries from handling mines.[5]"

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[5] Data from Andy Smith, DDIV database, April 6, 2000.

Mine Detection Dogs At Work

continued from page 87

the [dogs'] ability to detect plastic mines when metal detectors are ineffective is even more important."

The Global Training Academy has the capacity to train 30-36 dogs per year in mine detection. In 2001, 18 dogs will be trained for deployment in Lebanon, Oman and Thailand. In addition, the Academy currently has dog teams working in ten countries: Mozambique, Rwanda, Bosnia, Costa Rica, Honduras, Nicaragua, Croatia, Namibia, Thailand and Afghanistan. These dog teams often work with the host country's military in mine clearance operations.

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M-Detect

M-Detect, a mine dog training facility in Germany, specializes in training MDDs for mine detection operations in mine-affected countries. Each year, M-Detect trains and deploys approximately eight dogs. This year, MDDs are being trained for deployment in Bosnia-Herzegovina and Croatia. Martin Weitkamp, director of M-Detect, said MDDs are "an important part of the international demining toolbox" if used as quality assurance in unknown areas. Weitkamp adds that dogs should not be used in a known mine field in place of deminers or demining machinery but in unknown areas where sweeping the fields with an MDD is faster and more efficient.

■ The training period ends with MDD leading the trainer. *c/o Martin Weitkamp*

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Conclusion

MDDs are an effective means for mine clearance operations worldwide. With proper training from mine dog companies and organizations, MDDs employed in mine-infested countries return successful results. Their driven success continues to be an asset to countries in times of need. ■

The Challenges of
Integrating Mine Dogs into Humanitarian Demining

From sentry duty for Napoleon to mine sniffing in Vietnam, dogs have played key roles in war and peace for centuries. More accurate than human beings and many metal detectors, dogs are now being used in more and more detection capacities.

The relationsip between handler and canine is a key component in the success of a working dog. *c/o AP*

By Margaret Busé, *Editor*

The story of mine detection dogs (MDD) is really the story of the successes and failures of canine use in the military. Dogs have been used since antiquity by armies, both passively and actively. In the 20th century, the Red Cross and European military utilized dogs with a high degree of success. The establishment of organized training facilities, instilling the proper training of both dog and handler and capitalizing, utilizing and understanding a dog's skills, are the key elements of a favorable canine operation. MDDs and their users have benefited from lessons learned by the earlier use of dogs in the military. While there may still be challenges to fully utilizing a mine dog's potential, they have been deployed by commercial companies and NGOs with varying degrees of success. Their use will continue to be debated in the HD community until better scientific understanding of their scent detection capabilities is demonstrated and the relationship between the handler and canine improves.

Origins of the War Dog

Dogs were first used as an offensive and defensive weapon of war. Michael G. Lemish, author of *War Dogs*, wrote, "Persians, Greeks, Assyrians and Babylonians all recognized the tactical advantage of war dogs and deployed them as forward attacking elements." Even women led packs of war dogs against the Romans at the battle of Versella, which delayed the Roman's victory. The Romans eventually adopted dogs as a military tool of their own. The Roman dogs, bred for fierceness, were encased in body armor with razor sharp spikes. Writers of the day reported that these dogs would not retreat even against men armed with swords. Later, Napoleon used dogs for protection and sentry duty by chaining them to the walls surrounding Alexandria. Europe had a long history of using dogs in various working roles. The military simply capitalized on this use.

In America, the Native Americans used dogs for sentry, pack duty and as draft animals. Early colonists relied on dogs for herding. It was Benjamin Franklin that first proposed the use of dogs as military weapons. He wrote: "Dogs should be used against the Indians. They should be large, strong and fierce." John Penn, founder of Pennsylvania, said, "You will acquaint the captains that every soldier be allowed three shillings per month who brings with him a strong dog for pursuing the savages, put this idea into action. Each dog is to be kept tied and led by his owner."

A well camouflaged marine and his dog, Soloman Islands, World War II. *c/o AP*

Dogs were not used by Americans to the same extent as the Europeans and therefore were not organized by our early military into any type of working canine units. This lack of central organization, in part, led to the lack of success of U.S. canine military units well into the 20th century.

Dogs were employed during World War I by European armies for ambulatory assistance, messenger service, sentry duty and as scouts. The Red Cross dogs composed the most organized and successful canine units. The dogs carried medical supplies and canteens to wounded soldiers. They were trained to not recognize dead soldiers. If a soldier was found unconscious, the dogs would return to their handlers and lead them to the location of that soldier. The Red Cross dogs often worked at night and relied on their olfactory abilities to find soldiers. Canines were also used as pack animals and could carry up to 40 lb of supplies that included water, grenades or ammunition. The war dogs successes guaranteed their use in World War II. For the Americans, the bombing of Pearl Harbor was a catalyst to the American military to investigate the utilization of canines as a military tool.

At the time of the bombing of Pearl Harbor, the U.S. Army library contained only one book about dogs —a field manual for canines in arctic regions. The bombing of Pearl Harbor mobilized some American civilians to contact the U.S. military. Dog breeders, trainers and the director of the American Kennel Club were well aware of the use of canines by the Europeans. They formed the Dogs for Defense (DFD) to band together volunteer amateurs and professional dog handlers and breeders. They assumed the military would jump at their offers for dogs as offensive military aides, but the military didn't. It was only with the help of actress Helen Menken, coupled with the increased U.S. activity in the war effort, that the army was prompted to take another look at the DFD.

After a slow start, the U.S. secretary of war ordered that the dogs be trained for sentry duty, search and rescue, patrol, and messenger service. With the DFD as the dog recruitment agency, organized war dog training centers were soon established. After the war, the PFD was disbanded and the dogs were retired to civilians.

Through trial and error the U.S. dog operation had varying successes through the 1950s. It was during the Vietnam War that canine use went to the next level of utilization. The Air Force studied the practicality of using dogs in the temperate climate of Southeast Asia, combining a sentry/scout dog, finding the best breed to use, and developing an in-country breeding program. The initial problems were getting the South Vietnamese handlers to accept these working dogs. Because of a lack of centralized structure, intermittent use among all the military branches, and a lack of careful obedience and tactical training, the successes were coupled with problems and failures. Lemish attributes this to the lack of a centralized program like the DFD in World War II, the treatment of dogs by the military as superfluous equipment, and the inability to demilitarize war dogs.

A common thread among both European and American forces was the concept that a good dog handler can capitalize on the assets a well-trained dog can bring with it to a military endeavor. The best dog handler was considered a soldier that could scout and patrol on his own and use a dog as an extension of his own talents. The foundation philosophy is that canines are one of numerous military tools and when combined with other instruments, can get the job done. These could be the very philosophies the humanitarian demining community may need to adopt to successfully integrate MDDs into operations.

As with other mine clearance technologies, dogs are not a replacement for deminers and metal detectors. Rather, they can be an additional mine clearing asset to a demining program. Author Rae McGrath writes in *Landmines and Unexploded Ordnance* that MDDs are most effective in well-defined clearance operations and that they "can work more quickly than normal clearance teams, such as road and track sections containing widely spaced mines." McGrath also notes that an MDD is a valuable asset in battlefield areas with high

"A mine dog licensing test can be compared to a driver's license test. Its purpose is to provide confidence in a basic capability to detect mines and tripwires. I have learned that testing and licensing has a positive side effect since the overall quality of the work seems to improve significantly." — Harvard Bach, GICHD

JOURNAL: The Journal of Mine Action Issue 5.1

metal content. They can speed up the detection process because they recognize explosive scent, rather than metal.

In contrast, Harvard Bach, senior liason officer of the Geneva International Center for Humanitarian Demining(GICHD), feels dogs should not be used to verify individual mines, but to verify the boundaries of a mine field. Eddie Banks, director of BiH, supports this. He said: "A dog is a location tool. If you already know where the mines are, you do not need a dog."

There have been many challenges to effectively integrating MDDs into humanitarian mine clearance operations. Coordination, timing, cost, availability and mismanagement have all been cited as reasons that dogs have not been effectively integrated. Extensive training requirements of dogs, handlers and demining management is needed for a program to start successfully.

Bach says that coordination, timing, and determining the best deployment scenario for dogs are also factors. Banks adds, "There are two major problems: We cannot prove how effective a dog is and many managers, at all levels, do not understand the advantages and limitations of dog teams."

He feels a major deterrent to successful deployment of MDD's is that many experts in this field have no relevant, practical

Two Russian soldiers try to seperate their dogs. *c/o AP*

"If you are using a dog you are using it as a primary detector. Based on my experience, [if] managed properly, a dog is a more effective than a human being and most metal detectors in the detection role. However, dogs have limitations, therefore the combination of deminers and dogs can be most effective. Even in the quality control role a dog is being used to confirm that an area is clear." — Eddie Banks BiH

experience using dogs in a humanitarian clearance role. "We need to train the managers, both internationals and nationals, in order that we can manage these and other aspects professionally and effectively. The challenge is to get all levels of management, handlers, team leaders, monitors and inspectors to understand how to effectively use this tool."

Banks feels that what an organization needs to be successful is the understanding of the dog's capability and the understanding of how to manage the dogs and the demining operation effectively. "Good organizations are based on sound management," he says. "[They] employ appropriately qualified and trained personnel with suitable personalities, and adopt an open minded, flexible attitude that promotes effective clearance to high standards of safety and quality."

Successful integration of MDDs can be achieved through an effective training, purchasing and management program and by identifying the dogs' strengths and weaknesses and deploying them effectively. Coupled with a humanitarian demining management system that can integrate varied assets effectively, this can result in effective dog deployment in the mine field.

The MDD field has grown in step with humanitarian demining. With all levels of failure and success, the industry has seen a jump in the last 10 years from a handful of MDD organizations to over 25 organizations utilizing mine dogs. Very few NGOs are currently involved in MDD operations though HALO, Norwegian People's Aid (NPA) and Handicap International have all used mine dogs. Many commercial companies have proven to be serious promoters of MDD endeavors. The national dog program in Afghanistan has been very successful with more than 130 dogs and handlers operating in the field. Bach feels if the aim is to run a short-term operation, expatriate specialists should be brought in to the country. If the operation is long-term, local handlers must be trained.

In general, dogs are more effective in environmental conditions that include a degree of soil moisture, which increases the transportation of scents from the ground to air. Dogs usually work better in the morning when there is still dew on the ground. As the air heats up, the hot air rises along with the target scent, making it more difficult to detect. It stands to reason that dogs are less effective in extreme weather conditions—be it snow, heavy rains or high winds. These conditions all displace scent.

While a dog with good scenting capabilities is needed, dogs must also possess a good hunting instinct. Whether dogs should be bred, indigenous or trained has been widely discussed. Benefits and drawbacks to all methods have been identified and debated. With large-scale organizations it could be advantageous to breed dogs for mine detection. Smaller organizations are better off purchasing trained dogs or training indigenous dogs. The GICHD is currently implementing a study to see which dog breeds are most suitable for mine detection. Most organizations assess individual dogs' capabilities and proceed from there. It can be considered a given that choosing suitable dogs and handlers that meet training and operational needs is essential. "Thereafter, it is all about initial selection, professional training, selection and training of good handlers, a good bonding process and ensuring continuation of training," Banks states.

All would agree that MDD programs have expensive startup costs and that it is vital for donors to understand this critical factor. Also critical for donor support is the ability to understand that it takes time to establish an MDD capacity, whether you are facilitating breeding, buying dogs, or integrating a training and handler education program. Once properly established, an MDD program can be an effective tool in the mine clearing toolbox. With limited retraining, it is feasible that an MDD can be utilized and beneficial in other scent capacities like explosives, forensics, narcotics, and search and rescue.

"I believe that MDDs will become more credible and less costly in the future. The latter due to more experience/documentation and less training failures. We will have a better understanding of the potential for and the limitations to mine dog detection. We will also be able to integrate mine dogs into a combined demining approach in a better way then we currently do," Bach says.

Banks agrees with these sentiments. "If we can improve management of demining, including the husbandry and operational capabilities of MDDs, then I feel we could change current procedures in order that dogs could be used even more effectively and productively," he explains.

The keys to success with these war dogs or humanitarian dogs do not lie so much with the individual dog or species in general, but with the handling by mankind. ■

"I believe that MDDs will become more credible and less costly in the future. The latter due to more experience/documentation and less training failures." — Bach

A dog and his handler on patrol in the South Vietnamese jungle. *c/o AP*

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K9 Demining Corp to Aid Clearance Efforts in Lebanon

The Marshall Legacy Institute, with major contributions from the Humpty Dumpty Institute, is contributing six mine detection dogs to the Lebanese Army's mine clearance team.

by Elizabeth A. Cramer, *MAIC*

A team of six mine detection dogs (MDDs), known as the K9 Demining Corp, has been sent to aid mine clearance efforts in Lebanon. The dogs will be a part of the Lebanese Army's extensive mine clearance throughout the country. According to the *Landmine Monitor Report 2000*, the U.S. Department of State has estimated that there are 35,000 mines in Lebanon, not including the previously Israeli-occupied area of South Lebanon, where the U.N. estimates there are another 130,000 mines causing immediate risk of landmine casualities.

The United States has already contributed $2.3 million to humanitarian demining programs in Lebanon since 1998. In an effort to ensure the successful integration of the mine dog teams to humanitarian demining, the U.S. Office of Humanitarian Demining Programs (HDP) has created a partnership with two NGOs to fund and deploy the K9 Demining Corp, and has provided funds for the training of Lebanese handlers and for infrastructure support. The HDP contracted RONCO Consulting Corporation to provide the MDDs, associated training and equiptment for the Lebanese dog handlers.

The K9 Demining Corp was created with funding contributions to the Marshall Legacy Institute (MLI), a non-profit international humanitarian organization. MLI is leading a national campaign to increase the number of MDDs worldwide. By combining private tax-deductible contributions with U.S. government funding, MLI is able to help build humanitarian programs in mine-affected countries.

A major contributor to MLI is the Humpty Dumpty Institute (HDI), a non-profit NGO formed in 1998 by American business leaders to promote private-public partnerships to confront global problems. HDI focuses on programs to strengthen U.S. and U.N. relations and on the global clearance of landmines. William Rouhana, co-chairman of HDI, believes that dogs are among the most effective tools in mine clearance. Rouhana, also chairman of Winstar Communications, and his wife Amy Newmark are among the major contributors for the Lebanon project. Rouhana and Newmark requested that guests at their recent wedding contribute money to the HDI to aid in the training of mine detecting dogs, instead of giving traditional wedding gifts. HDI funding to MLI has provided for the purchase, training, certification, and transport of six dogs, each costing $16,000.

At the time of the donation, it was planned to send a corp of dogs to Eritrea for humanitarian demining. Because of internal conflict in the country, the circumstances were later considered unfit to send the dogs, and a replacement country was needed. In

Lebanese soldiers stand in a safe lane during a clearance operation. Operations like the one shown will soon be enhanced by the presence of mine detection dogs. *c/o AP*

Dan Hayter with Peggy, Baltimore, and the National Demining Office's Maj. Mohammed Jamal El Kaakour, Lt. Col. Takieddine El Tannir and Gen. George Sawaya with Taz at the Global Training Academy, Texas. *c/o MLI*

June 2000, Perry Baltimore, president and executive director of MLI, conducted a feasibility study on the use of mine dogs in Lebanon. The study resulted in a request from Gen. George Sawaya, president of the National Demining Office in Lebanon. Sawaya asked that MDDs be integrated into the Lebanese mine clearance program to accelerate the pace of demining operations. The Lebanese Army is responsible for all current demining efforts and reports that in areas of difficult terrain, mechanical mine clearance methods are not viable but could be replaced by MDDs. At the time there were no MMDs in the country, and it was considered an exciting option for mine clearance efforts. Lebanon was choosen for the K9 Corp and the dogs were prepared.

The MMDs were first trained in Europe in obedience and socialization. They were then sent to the Global Training Academy (GTA) in Texas and there underwent 12 more weeks of training in explosive scent detection, odor, response, positioning and search patterns, under the direction of trainer Paul Brown. While in Texas the dogs became acclimated to the living and working environment, including the temperature, odors, soil and kennels. At GTA dogs are assigned a temporary trainer who takes them through scent training. The biggest challenge for the trainer is learning what motivates each dog and applying the motivating factor in the training. The trainer must teach the dog to associate a reward with a target scent. Baltimore believes that the training was successful, "The dogs have learned and responded well."

On Nov. 28, 2000 Queen Noor of Jordan, an MLI board member, announced the K9 Demining Corp program at the U.S. Mission to the United Nations during a deployment ceremony for the dog team. The ceremony was attended by officials from HDI, MLI, and the State Department. During the deployment ceremony Sally, a two-year old Dutch shepherd, was given the chance to display detection skills. Sally was able to detect an inactive APL that was buried among many large planters in the conference room. At the ceremony, HDP Director Pat Patierno stated that he is confident that the combination of trained dogs and local handlers can create what is possibly the most optimal demining technology for Lebanon. He explained that no one method is the answer to mine clearance difficulties, however, the challenging terrain limits the use of machinery, making dogs the most possible solution.

The dogs were prepared to depart with a series of vaccinations and were deployed to Lebanon on Feb. 12, 2000. Reliable air carriers delivered the dogs in good condition. Upon arrival in Beirut the dogs were happy to receive food, praise and play from a familiar face, trainer Paul Brown. The dogs then began a period of acclimatization, becoming accustomed to the new environment. During this period the dogs are rematched with local Lebanese handlers. To make the best matches of handler and dog several factors are considered about the handler, including their skill level, balance and coordination, hand gestures, adaptation ability, use of commands, personality and temperament. The rematch takes some adjustment for the dog, but as the handlers care for, train with and nurture their dog they develop a strong bond.

Now in the mountains northeast of Beruit, the dogs will undergo three more months of training. The training is important for the dogs and their new handlers so they can learn to work as a team. During the training the dogs will learn to identify the types of mines that are common to the area, and the smells that are associated with the explosives of the mines. The dogs will eventually become exposed to actual mines.

In April 2001, the K9 Corp will be deployed for their first clearance mission. Baltimore and Brown believe that favorable environmental conditions, receptive leadership and a positive military working dog experience all support the indigenous MDD program. There is only one major concern, some sharp prickly bushes in Lebanese fields, which may make it difficult to keep the dogs' noses to the ground, and to the task at hand—making way for a safer Lebanon.

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JOURNAL: The Journal of Mine Action Issue 5.1

K-9 Dog Academy Takes its Training to the Mine Field

The Journal senior editor Margaret Busé sits down with dog trainer Malinda Julien to discuss the K-9 Dog Academy and the future—and present—of mine detecting dogs.

Malinda Julien and her canine team member. *c/o Malinda Julien*

By Margaret S. Busé, *Editor*

Margaret Buse (MB): Can you tell me the history of Thunderstorm Canine and the K9 Academy?

Malinda Julien (MJ): The academy is actually a small part of what we do. Thunderstorm Canine is undergoing a change. The kennels were originally designed to work search and rescue. In our search and rescue work we came across the law enforcement folks who kept telling me that they could really use some good canine units. We decided to go into explosives, cadavers, narcotics, evidence search, along with search and rescue. Now we are planning to go into mine dogs. Living here in the United States and not traveling abroad very much it never really dawned on me on how severe the problem really is. When I went to the conference [Mine Detecting Dog Conference, San Antonio, Texas] and got to meet the people involved and found out more about that situation, I realized that there are not enough sufficient dog suppliers. So, we decided to dedicate a lot of our program to mine detecting dogs (MDDs).

MB: What is the basic training needed by all working dogs before they can be deployed into a specific situation?

MJ: In our view it starts even before the dog is born—the genetics. For example, the litter we dropped in January is specifically targeted for explosives and MDDs. They will be scent imprinted. This is something that I do with all of my litters. Some of the old-timers think it doesn't work, but we are convinced that it does work. The pups themselves are actually reared with certain scents that they will have to find later. What we are trying to do is cut down on handler error. The handler is our number one problem. When pups are scent imprinted they will seek rather than be taught this scent. MDDs will be trained using a specific scent like TNT, or other types of materials that will be found in mines. After that they go through an extensive off lead program where they are heavily conditioned to do as they are told. People refer to that as obedience. We refer to it as tactical obedience. These dogs must be able to stop on a dime. They must have the ability to do anything we ask them to do without being forced by lead or choke. Therefore, the dog is compliant. At that point the dog is 12 weeks old and the training starts immediately. We put them with more experienced dogs, dogs that are already detection dogs, usually their parent. The dogs work with their mom and do what their mom says. It gives us a more stable dog.

By the time a dog is four to five months old they are ready to be introduced to a handler and a leash. Our programs have been very successful. We have dogs certified and on the street before most people begin training. Our approach extends the working life of the dog, cuts down on handler error, and makes a more successful team for handler and dog. They work more productively all at less cost.

"Most dogs we train never see a leash for the first five to six months of their lives because stupidity goes down the leash and it goes right into the dog. The dogs do not know what you want, the dog does not understand. The dog understands one thing: survival. If being a part of the pack means food, warmth, security and survival, the dog will do anything that is necessary for it." — Malinda Julien

MB: You mentioned that they seek scent rather than being taught the scent. What does that mean?

MJ: The training world has not budged much from 1950. Most of the people who are in this field are using the methods from [the 1950s]. We are looking at it from a fresh perspective. We want the dog not to have to be taught by humans. First, we don't speak their language. Second, we can't possibly understand what it is that they think. This is why many scent programs fail because the handler is teaching them to find the wrong thing. They may be thinking that they are teaching them to find the desired scent, but they are teaching them to find something that they tap on or that is in a particular container. What we have done is based on studies that came out of the 1960s on the training and socialization of dogs. It was established in the scientific community that you could imprint anything onto an animal while it is being raised. We are teaching a dog to want to find a particular smell. The smell is incorporated into everything that is good—food, warmth, affection all the things that the mother supplies. It's like when we have had a grandfather who chewed peppermints—everytime we smell that we think of him. Dogs in turn seek that smell which they associate with what is good. We have taken out about six months of the conventional training program in which we could possibly not do as well as nature could itself. So, we imprint the dog with a particular scent so the dogs seek the scent rather than be taught to find it.

Disaster training school. Julien sits on top of the truck. *c/o Malinda Julien*

MB: What qualities would you look for in a good MDD?

MJ: Stability, nerves of steel. A dog that can handle a great deal of stress without loosing instinct more than anything else. In setting up programs, one of the things I intend to do is teach evaluators what they really need to look for in a dog. They need to get one very young or find good parent dogs and breed from them.

MB: What advice could you give to organizations that are working with indigenous dogs so that they don't have a high washout rate?

MJ: The biggest problem in using indigenous dogs is we are taking a dog that has no socialization skills with humans. Unless we can breed them from the indigenous dogs that exist we are going to be missing the mark. Strays have very little positive socialization with humans. We need dogs that look at us as providers. Most strays have been providing for themselves for some time. Also, some dogs may have too strong a herding instinct and we need a hunter

MB: When a dog has gone through your training program how do you measure and determine its competency?

MJ: I am pretty tough on the dogs that go out. I want 100 percent accuracy rate. If a MDD was to go out of my academy and he is one year old, he has gone through all of his training. He has spent six months with a handler and is ready to go out in the field. If we set up a program, unless he finds 10 mines in three different areas 10 times each under all terrain and different weather conditions reliably, the dog would be put back into the program. Many of the current programs out there allow for 70 percent accuracy. That is not good enough. In our academy only the professionals work with the dogs through the entire training process. The dogs are not handed down to assistants. We may not produce a lot, but the quality and assuredness of that dog is much higher than the dog that is mass-produced.

MB: I know you work predominantly with purebreds, but as the conference revealed, some organizations do not have that luxury. They are working with stray or abandoned dogs.

MJ: We work with pure breeds for a number of reasons. In the United States, we are a very visual society and people expect to see the German Shepherds in police work. However, we have a program that works with re-homed dogs, dogs that may be strays, abandoned, not wanted for whatever reason. In the MDD field, I feel it may work better if we used indigenous dogs. Dogs that are already there are climatized and they can have their talents capitalized. There may be some that wouldn't work but there will be many that can. Purebred dogs usually have more genetic problems than mixed breeds. So I don't have anything against these and would use dogs that are already in place in an area and breed on characteristics that would be desirable.

control, running or fighting. I have seen this happen many times. Dogs may be able to perform the duty in a test environment but when they get out in the field their nerves fail. That is our number one evaluation tool. What can this dog handle? What is his stress level? If he has a good stress threshold and a good drive to hunt or prey drive then he is a likely candidate as an MDD. Size will also be important. Small feet, smaller size, easier to transport and less dog trotting around a mine field. These are the qualities I would establish in setting up a program.

MB: What else in the current canine training process would you do differently?

MJ: Without being involved with specific training programs, I can say assuredly there

Quat, a stray that became a star working dog. *c/o Malinda Julien*

are things I would probably change because my guess is that they are training an old style of training. We need to approach the training from a psychological perspective and from the dog's and handler's point of view. Educate the handler as to what the dog is doing and predispose the dog to find it, then we would have a much higher success rate than what we have now. I recognize in some countries this may be a challenge. Basically, we want a program more educated on the handler side and less work on the canine side.

MB: You have mentioned about the handler playing such a crucial role. Can you tell me more about the crucial role the handler plays with the dogs?

MJ: The biggest problem that we have with handlers is that we don't speak the same language. We see things from a human point of view and dogs see things from a dog's point of view. As long as the human reads the dog through human interpretation, they are always going to be wrong. A handler must know something about canine or social animal behavior. Most dogs have been taught correction or praise or a combination of both, and usually it is incorrect. It sets the dogs up to fail. It is the number one problem of all canine handlers. However, if we give handlers some education, we set the dog up to win by having a handler that is better equipped and we set the handler up for more successes. I often hear I can't get the dog to work. The problem is they don't understand how to make them work. We sometimes expect the handler to do too much in a short amount of time. The handlers need to be our number one priority and they must know how to read the dog.

MB: What are the three basic foundation qualities that are needed in a good dog handler?

MJ: They need to be patient. No egos running around out there. They must have a true desire to work with the animal. It is probably not one of the most respected things to say that you work with an animal all day so they must have strength from within. They must enjoy what they do and be good at it. You must have confidence in your animal. If the dog says it's there you have got to believe the dog. These are qualities that can not be taught, they must be present within the handler. Slow and steady as she goes, that's the handler that we want.

MB: A problem for many organizations integrating MDDs overseas is the cultural biases of the indigenous populations that must be trained to be effective dog handlers.

Malinda Julien on a drug search. *c/o Malinda Julien*

MJ: That really does present a problem. I have traveled in that part of the world and I am aware of the stigma that is attached to a vermin animal like a canine. I realize the psychological ramifications for them must be tremendous. I don't think there is a clear-cut answer. If the MDD program is successful and the dogs are successful and well mannered it will help in the dogs being received well by the population—at least so that they don't disdain them. Eventually, we can overcome the biases—to a point. Trying to recruit these individuals will take a lot of work. The institution must take pride in what they do. Perhaps not seeing the "dog" in the situation, but the clearance of fields as the mission would help increase the pride of working with dogs.

"We work within the parameters of the behavior and social structure of the animals. When we stop throwing on big, nasty chains, choking them to death and...heavy punishments out of our own frustrations, then the dog will work better for us." — Malinda Julien

MB: You and your organization have both bred dogs and received dogs from other sources. What are the benefits and drawbacks to both approaches?

MJ: When we breed the dogs we know what we are going to get, within certain parameters. We can scent imprint and do everything from a social aspect. The dogs are ready to go much faster. The biggest problem is that it takes time to raise a dog. In the year that it takes to begin working is time that a dog from another source is already mature. That dog may posses everything it needs and we can proceed from there. It really depends on your situation. How fast is this dog needed? What do we have available? Some times your kennel is full and other times you have to depend on outside sources. That is why we plan to dedicate this upcoming litter to MDDs.

MB: Your academy is very integrated. You do a lot of different aspects of canine training from search and rescue to narcotics. Do you think dog training academies should be multi-faceted or single use facilities?

MJ: We really only do one thing. We use dogs as a scent detection tool. Whether we are looking for explosives, mines, narcotics, forensics or live people is really not the issue. It is the fact that a dog is being used as a detection item. These are the things we have specialized in: the ability to utilize the dog to find a certain scent.

MB: MDD is a small, but strong field. Do you think canine academies may begin filling the niche for MDDs?

MJ: I don't think so. It is a real hard sell publicly. Here in the United States people will think that you are sending dogs to be killed. I don't think that the average working dog training facility will be able to train to the parameters that are needed for a successful mine dog. This is not like finding narcotics or a piece of evidence. This is very serious and lives are involved. I think it is probably cheaper for them to turn out overpriced police dogs.

MB: You mentioned briefly about public outrage. Have you had problems with animal rights groups?

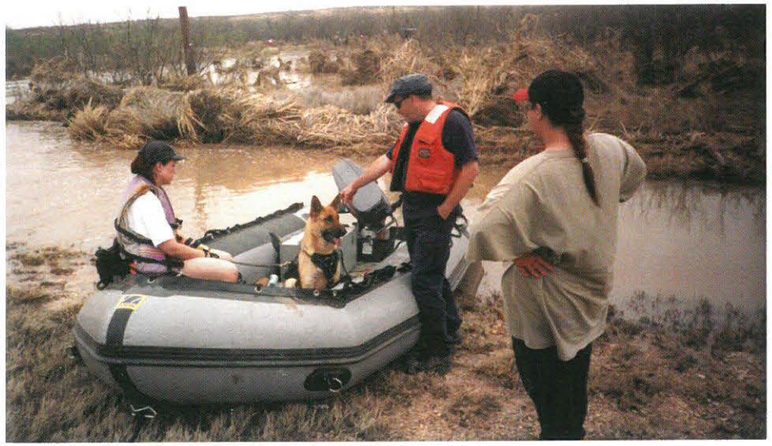
MJ: Yes, because they are misinformed and they think we are using the dog without any regard to well being. I do not mess with them. I just ask them to leave my facility. I have run into a lot of people who have gotten their hackles up when MDD's are mentioned because they think we are going to send Fifi into the mine field to get blown up.

MB: You have often mentioned how little the training methods have changed since the 1950s. Why is that so?

MJ: Just because they have been doing it for 20 years doesn't make it right. There is always evolution, there is always something new, but the people in this industry really are very adversarial. They see and view everyone as heavy competition. None of these changes will take place immediately, I guarantee you, but we are willing to take the slings and arrows in order to go out and attempt to do this. One of the goals in formulating our academy is to allow the newer people that are coming into the industry to have a broader view. The oldtimers have been doing it a long time, but it has stalemated and they just continue to do what they think works.

MB: Can you give me a specific as to how your training methods are different from this "old-style 1950s training"?

MJ: Our training methods are very different because they are based on an entirely different view. The old phrase used to be, "I am the master of my dog," and that's typically how it was looked at. It was never looked at as a partner, as an entity unto itself. The dog was something that we told what to do and if it doesn't do it I will make it do it. As we have become more involved and more educated we have definitely found out that your grandmother was right, you can catch a lot more flies with honey than you can with vinegar. We work within the parameters of the behavioral and social structure of the animals. Most dogs that we train never see a leash for the first five to six months of their lives because stupid goes down the leash and it goes right into the dog. The dogs do not know what you want, it does not understand. The dog understands one thing: survival. If being a part of our pack means food, warmth, security and survival, the dog will do anything that is necessary for it to do. So, we look at it from an almost completely 100 degree difference from the rest of the world. There are a lot of technological advancements such as electronic collars that make us more precise. There are a lot of things we can do rather than tie the dog to us and choke the air out of it every time it doesn't do what we want. All that does is break the bond between the handler and the animal and makes the animal more reluctant to work for the



Malinda Julien in boat with Gypsy. Cadaver search during floods in Texas. *c/o Malinda Julien*

Malinda Julien rappelling with Quat. *c/o Malinda Julien*

SAR Team. *c/o Malinda Julien*

handler. The handler becomes frustrated, the handler says the dog is stupid, the dogs say I'm scared of you, and there we have 1950s dog training. That's why most people all the way from pets to law enforcement fail in their K9 programs. So, we don't approach it from that perspective. We approach it from a scientific point of view. If we want to get the dog to work for us, we must understand the dog and his behavior and his language. That's what we teach.

"They still want to do what we call 'Billy Bob' training and it does not work. It will work for a little while or it will work 60 to 70 percent, but it doesn't give us the amount of efficiency and accuracy that we would require in a mine detection dog." — Julien

MB: That type of change actually occurred in the horse industry with the horse whispering training that has received media attention. It really revolutionized the training methods that had been in place since the cavalry days.

MJ: Yes, it has, and it took just a couple of people to be visual enough to get the public behind them. The United States, in its quest to have K9 units are still in the John Wayne phase of it all. They still want to do what we call Billy Bob training and it does not work. It will work for a little while or it will work 60 to 70 percent of the time but it doesn't give us the amount of efficiency and accuracy that we would require in a mine detection dog. I think this is a whole new field that really no one is looking at and it starts with working that trainer and getting those dogs where they need to be, not necessarily together and not necessarily at the same time. Unless we teach these people how to be more educated handlers and show them how much they do need to know about themselves, about situations, about the animals, they are not going to be more successful.

MB: I'm sure in all the years that you've been training and breeding, a lot of dogs have passed through your academy. Do you have any unique or favorite success story from working with one specific dog?

MJ: I have a dog and she is still with us. She is old and aged at this point. She was nothing but backyard garbage, terrible, disgusting, everything confirmationaly wrong with this dog. I do not know to this day why, I decided to risk life and limb to handle this dog. We pumped tons of money into her and made her well. I worked with her and to this very day she is responsible for finding many folks who would be dead without her. She works narcotics for me in the school systems, she runs security for our property, and she is probably going to retire in the next year or two. She is probably one of the most heartfelt, soulful animals that I've run across in all of my years. Somewhere in those eyes was simply somebody who said, "If you save my life, I promise you, I'll make it worth it." And she has. She's very much a part of our company. She is very much a part of everywhere we go. This dog is usually always present and people all over the world actually know this dog by name. Her name is Quat.

MB: With working with a lot of different animals, you can have good relationships

Malinda Julien with Quat and Puppy. *c/o Malinda Julien*

with a lot of animals, but there comes that special one that you just have this unique bond with. Not only do you have a unique bond, but they go the extra mile for you.

MJ: It is absolutely incredible and once you have that, it opens the way to have others. I had a Doberman that was with me in the Oklahoma disaster and he has since gone on to be in the Pet Hall of Fame. He is now retired and lives with a friend of mine in Colorado; however, this dog again was a stray, a nothing. He was a beautiful Doberman, but he was extremely mean and had been abused. I took the dog for God knows what reason and I trained this dog and it would do anything I asked it to do. I asked this dog to jump out of the back of a fire truck while we were in Oklahoma. I said, "I need you right now!" You know how big a firetruck is? The dog jumps right out, it pops his jaw on the concrete, gets up, shakes his head and keeps right on coming. He wasn't an absolutely extraordinary dog and he met his fate not in the disaster areas of Oklahoma, but with a rattlesnake and became severely impaired mentally from too many bites to the head and thus was retired. If we can ever put dogs like that into the hands of these handlers, dog that are special. They are there; they do exist.

Handlers that can recognize those qualities do exist. It is our job to find them. It is our job to seek them out and to show them the gift that they have, as handlers, and to find the gifted dogs that are out there. You can walk through any shelter and one dog in that shelter will look at you with eyes that say "Take me out of here. I promise I'm good, I know I can do this, if you just tell me what it is." We've had many of those dogs. Many of these dogs are very successful in our police program. We have put them out with units that could not afford the over-inflated $10,000 (U.S.) fee. These dogs are doing marvelous, and they came from nowhere, but it was the right dog and it was the right handler. I firmly believe that those dogs know you saved their lives.Their bond with you is much stronger than that with the dog that simply came along and had it all made. If you can get those dogs, they will work and work and work until they drop. That's what we're looking for. That's what we want. That loyalty, that bond between animal and human, that is only in certain people and only in certain dogs and can only be done if a person is there to help facilitate the process. That's what we want to accomplish.

Cobra takes a break from training to play with Julien. *c/o Malinda Julien*

MB: What is in store for you for the upcoming year?

MJ: Hopefully, I will finish all of these shots and various pills I'm taking to go over to Croatia and Mozambique. I need to go over and see what's going on and find out who is looking for better ways to use dogs, what companies are willing to look at a more educated way of dealing with a very difficult and timely problem. I'm looking at spending a lot of time overseas. I'm looking at getting this program up and running, and seeing what we can do.

I think that 2001 will probably be one of our most exciting and rewarding years and I think we can definitely make a change and a mark in this industry that will enable us to clear those fields, which is our goal. If we can do that, I will certainly consider 2001 a tremendous year, that's for sure. ■

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NOTES FROM UNITED NATIONS MINE ACTION SERVICE

The United Nations Mine Action Service (UNMAS) serves as the focal point for all U.N. mine-related activities carried out by 11 departments and agencies within the organization. This coordinated and proactive approach minimizes the potential for duplication of effort, and ensures clear delineation of responsibility and integration of work by all involved. To fully address the needs and objectives of U.N. mine action, UNMAS is responsible for the coordination of:

- Mine action policy development and coordination;
- Assessment and monitoring of the global landmine threat;
- Mine action program initiation and support;
- Information management;
- Quality management and technology issues;
- Advocacy and consciousness-raising; and
- Resource mobilization.

Policy Development and Coordination

As focal point, UNMAS develops policy to guide the cooperative efforts of all those involved in U.N. mine action in support of humanitarian and peacekeeping operations. *Mine Action and Effective Coordination: The United Nations Policy* was developed in close consultation with other partners in 1998 to clarify the key principles on which mine action is based, and to identify roles and responsibilities within the United Nations for all mine action activities.

UNMAS has continued to develop further guidelines to augment this policy, including a 1999 paper on cooperation with indigenous militaries, which establishes the range of assistance to military involvement in mine action, and emphasizes the key principles of neutrality, impartiality and humanity. Other guidelines are also under development in close cooperation with U.N. agencies and departments and other key entities.

UNMAS also chairs an inter-agency consultative and priority-setting mechanism within the United Nations, and an additional forum involving key NGO and international organizations.

Landmine Threat Assessment and Monitoring

UNMAS assesses and monitors the global landmine threat in order to identify needs and develop appropriate responses. Inter-agency and multi-sectoral assessment missions are deployed to affected regions to define the scope and nature of the landmine/UXO problem, identify constraints and opportunities affecting the mine action response, and formulate recommendations for mine action activities. Thus far, 15 such missions have deployed. Depending on the situation, Level 1 Impact Surveys are often developed as a follow-up to such assessment missions, with the information gathered being used to determine priorities and identify areas with the greatest needs. Impact Surveys identify the general location of known and suspected mined areas, and focus on the evaluation of the humanitarian and socioeconomic impact of landmine contamination.

Program Initiation and Support

In keeping with the U.N. mine action policy, responsibility for supporting long-term integrated mine-action programs rests with the United Nations Development Programme (UNDP), where UNMAS remains involved in an advisory and monitoring capacity. In the context of humanitarian emergencies and peace-keeping operations, the involvement of UNMAS is more critical and direct. It is responsible for the planning, establishment and coordination of deploying mine action operations, as well as their support. The most significant ongoing programs implemented under UNMAS auspices include Kosovo (FRY), southern Lebanon, and the program in the Temporary Security Zone between Eritrea and Ethiopia. UNMAS is also responsible for supporting the effective integration of mine awareness and victim assistance activities with other mine-related activities.

Information Management

Given the scope of the landmine problem, the wide spectrum of factors to take into consideration and the number of actors involved, the development of an appropriate information management system has been identified as a priority to support proper monitoring, planning and program implementation. As a result, UNMAS has asked the Geneva International Centre for Humanitarian Demining (GICHD) to develop the Information Management System for Mine Action (IMSMA). Thus far a "field module" has been developed and has been deployed in a growing number of countries, while the second phase—developing a "global module," as well as improving the existing version of the field module—continues.

Additional initiatives are also being continued with regard to information management issues, including development of improved electronic mediums for dealing with issues as diverse as donor funding and stockpile destruction, as well as cooperation with other initiatives in areas such as conformity of mine action information databases.

Quality Management and Technology

UNMAS is responsible for the development, maintenance and promotion of technical and safety standards for mine action. As a part of this role, with the support of the GICHD, the International Standards for Mine Clearance Operations have been revised, updated and expanded to become the International Mine Action Standards. Guidelines for mine awareness education have also been formulated by UNICEF, while the public health aspect of victim assistance sees the World Health Organisation (WHO) in the lead within the U.N. system to discuss requirements for additional standards with other actors such as the International Committee of the Red Cross (ICRC). With regard to technology, UNMAS has been called upon to take a role through the collection and dissemination of appropriate information, and the development of standards where required and practical.

Advocacy and Consciousness-raising

Advocacy, public information and consciousness-raising activities are integral parts of the international effort to rid the world of landmines, and UNMAS is involved in stigmatising the use of mines and supporting a global ban on these weapons. With over 100 States Parties to the Anti-Personnel Mine Ban Treaty, the emphasis is also shifting from advocacy to supporting treaty implementation, as more countries face the need to implement the obligations of ratification. UNMAS also cooperates with other organizations

continued on page 107

NOTES FROM GENEVA INTERNATIONAL CENTRE FOR HUMANITARIAN DEMINING

By Robert Diethelm, Support Director GICHD

The Geneva International Centre for Humanitarian Demining (GICHD) was established in 1998 to support the mine action efforts of the international community, in general, and those of the United Nations, in particular. The Centre aims to promote cooperation in the field of mine action in three main areas: research work; operational assistance; and support for the Mine Ban Treaty.

The GICHD contributes to the formulation and development of improved procedures, practices and technologies in mine action.

The studies elaborated by the Centre address actual problems brought up by practitioners in the field or by donors. With its research, the Centre aims to increase the safety of demining and the cost-effectiveness of mine action programs in the field. Examples of the Centre's current studies are:

- The **Revision of International Standards Project** provides practitioners and donors with an updated and revised framework of technical and procedural prescriptions for safe and effective mine action.
- The **Mine Detection Dog Study** analyses existing problems related with mine detection dogs (MDDs) (e.g. training and evaluation) to allow safe and efficient usage of the very promising potential of these animals.
- The **Socioeconomic Study** provides a framework for measuring socioeconomic impact and value, to help program managers to set priorities and to allocate resources most efficiently.
- The **Donor Guidelines Study** aims to assist donors in ensuring value for money and quality mine action from funded programs.
- The **Training Needs Analysis Study** analyses pre-deployment training needs of international experts filling the posts of program managers, technical advisers or similar key positions in field programs.
- The **Use of Military Organizations in Humanitarian Mine Action Project** aims to examine the practicability of using military organizations, both international and local, for all forms of humanitarian mine action. An appropriate integration of this potential could considerably increase the available work force for mine action.
- The **Project on the destruction of PFM-1 mines** shall establish how best to destroy stockpiles of such mines, since their liquid explosive filling is both toxic and corrosive.

The GICHD provides specific operational support and assistance for ongoing mine action activities in the field. The Centre develops and disseminates the **Information Management System for Mine Action (IMSMA)** in cooperation with the U.N. Mine Action Service (UNMAS) and other users. One of the key problems in mine action is information (e.g. location of mined areas, types of mines used, location of incidents). The Centre—in close cooperation with UNMAS, and supported by ETHZ Zurich—develops and disseminates IMSMA. IMSMA consists of:

- The "**Field Module,**" which provides a ready-to-use tool for mine action centers at the national and regional level, to cover their data collection and information management needs, and
- The "**Global Module,**" which refines and collates data from the field and provides the United Nations with improved capabilities for decision-making related to mine action.

To date, IMSMA is being used in Kosovo, Azerbaijan, Yemen, Chad, Estonia, Somaliland, Southern Lebanon, Eritrea, Nicaragua, Thailand and, on the regional level, in Cambodia.

The Centre provides operational support by providing short-term operational and technical assistance for newly established U.N. mine action programs by deploying members of its staff. In addition, the Centre carries out evaluation missions and provides the framework for the annual UNMAS Geneva Conference, which assembles mine action practitioners in the field, as well as at Headquarters level and provide for a comprehensive exchange of information and experience.

The GICHD supports the implementation of the Mine Ban Treaty.

The Centre also hosts meetings within the intersessional work to implement the Mine Ban Treaty. These meetings of the relevant Standing Committees bring together representatives of States Parties, non-States Parties, of international organisations, of NGOs and other experts in order to ensure effective implementation and to report to the States Parties. The Centre also provides technical input to theses activities in the area of mine clearance, victims assistance, stockpile destruction and technology.

The Centre is an independent and impartial specialist organisation.

It is supported by 17 governments, and the Republic and Canton of Geneva. The Centre's budget foresees expenditures of some 7.5 million CHF (about U.S.$4.6 million) for 2001, covered by major contributions from Switzerland and the United Kingdom, as well as by project oriented funding provided by Germany, Norway, Sweden, the United States, UNDP and the UNTF.

The Centre Staff

The Centre has 20 permanent staff members, including five seconded staff members sent by the Governments of France, Germany, Sweden, and the United Kingdom. Additional experts work for the Centre on a case-by-case basis. ■

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The U.S. Army's Countermine Training Support Center and Humanitarian Demining Training Center

In response to former President Clinton's landmine policy directives, the U.S. Army Engineering School formed the Countermine Training Support Center and the Humanitarian Demining Training Center at Fort Leonard Wood, Mo.

By Joseph M. Donahue, *Survey Action Center, VVAF*

Background

The U.S. Department of Defense (DoD) possesses a mine action resource whose existence is not widely known in the humanitarian demining community. In May 1996, the U.S. Army Engineer School (USAES) at Fort Leonard Wood, Mo., established the Countermine Training Support Center (CTSC). In September of that year, the Office of the Assistant Secretary of Defense for Special Operations and Low Intensity Conflict (SO/LIC) established the Humanitarian Demining Training Center (HDTC) at Fort Leonard Wood, Mo. Both were created in direct response to the Presidential Landmine Policy Directive of May 1996. This document directs "[the] Department of Defense to…significantly expand its humanitarian demining program to train and assist other countries in developing effective demining programs." It further explains that the "government program is to train the trainers, including equipping the host nations to sustain their own demining programs. The U.S. Department of State [DoS] and the Defense Department coordinate the funding and priorities to meet the demining needs of each individual nation."

CTSC is a countermine training and information center, and although discussed in this article, it is not the focus. The primary subject of this piece is HDTC, the U.S. military's primary center for humanitarian mine action knowledge and skills. The two centers share facilities and a joint mission statement and provide support to U.S. governmental agencies, international organizations, and other institutions involved in countermine operations and humanitarian demining. Recently, HDTC hosted the author as the first member of an NGO to attend training there.

I came to attend HDTC because of continuing efforts by members of the NGO and U.S. military communities aimed at creating more opportunities for positive interaction and mutual support. The HDTC basic demining course is tailored for each military team attending the course to ensure that the team has the knowledge it needs to conduct a successful "train-the-trainer" program in the host country that includes knowledge of the NGOs working in that country. Richard Kidd, program manager for SAC, said, "By initiating collaborative efforts in the classroom, members of various sectors in the mine action community will be much better equipped to interact and cooperate in the field." Collaboration between military and NGO mine action organizations is essential to resolving the global landmine contamination problem with greater efficiency and speed. This collaboration should begin at the training institutions within these communities.

CTSC/HDTC Mission Statement

"The mission of CTSC/HDTC is to serve as training and information centers concerning countermine and demining operations, demolitions, UXO and mine awareness, and booby traps. The centers research the latest lessons learned, tactics, techniques and procedures, and the use of mines by the United States and foreign countries. The centers incorporate acquired information into current lessons and provide innovative and realistic mine training tailored to a unit's needs. The centers also develop training and training aids in support of countermine and demining operations/training."

Staffing

CTSC/HDTC has an experienced and diverse staff consisting of eight civilian (including two RONCO contractors) and three foreign military personnel. Two periodically seconded by USAES to support CTSC, while SO/LIC funds the HDTC school and personnel. HDTC staff is drawn from the special operations, explosive ordnance disposal (EOD), combat engineering and commercial communities. The three foreign military exchange personnel, Maj. Griffin and Warrant Officers Estall and Clegg, are from the United Kingdom, New Zealand and Australia, respectively. These instructors have extensive experience conducting humanitarian demining and related operations in countries that include Afghanistan, Bosnia, Cambodia, Estonia, Kosovo, Mozambique, Swaziland and the Solomon Islands.

RONCO

RONCO Consulting Corporation is an international services firm that provides advisory, training, implementation and management assistance to private and public sector clients. RONCO is the only U.S. firm that has developed and uses "free running" explosive detecting dogs (EDD). In August 1999, RONCO was awarded a humanitarian demining contract by the DoS. DoS's Office of Humanitarian Demining Programs (Bureau of Political-Military Affairs) directs RONCO through task orders for specific mine action services. RONCO was tasked by DoS to provide HDTC with two experienced mine action technicians to serve as instructors. During the author's attendance at HDTC, a large portion of the technical instruction was provided by these RONCO instructors: "Bart" Bartholomew, a former Special Forces soldier, and Clarke George, a former Navy EOD technician. They have conducted humanitarian demining operations in Bosnia, Eritrea, Ethiopia, Kuwait and Nicaragua. Participation in the HDTC program is an important part of the larger RONCO contribution to the broad range of U.S. government mine action activities.

Training

CTSC/HDTC provides several different mine action courses. These courses are targeted at different audiences, and may be taught either at Fort Leonard Wood or by Mobile Training Team (MTT).

Countermine Course

CTSC conducts a two-day countermine sustainment-training course for U.S. military engineer units preparing to deploy overseas. This training may be provided at Fort Leonard Wood or through an MTT at the unit point of origin. CTSC maintains up-to-date information regarding countermine training, doctrine and mine awareness. This course focuses on military units and personnel.

Mine Awareness Training

Mine awareness training is integrated into both the CTSC and HDTC programs of instruction. However, this training may also be provided as a stand-alone course and is available to all U.S. military and government personnel deploying to mine affected countries. The training may be received either at Fort Leonard Wood or through an MTT.

Demining

The Humanitarian Demining Operations Orientation Course is a two-week program of instruction aimed at preparing U.S. Army Special Operations Forces (SOF) to train foreign military and government civilian personnel to implement national mine action programs. These SOF personnel travel to numerous countries to train their hosts how to set up and conduct demining operations. The humanitarian demining training team consists of several SOF elements: Special Forces personnel conduct the train-the-trainer portion for host nation deminers, Civil Affairs personnel conduct mine action center training and Psychological Operations personnel conduct mine awareness training. EOD personnel from all U.S. military services are also included if the mission requires their participation. HDTC conducts an average of two courses each month and has trained more than 850 student trainers since inception. Countries that have benefited from the program include Armenia and Azerbaijan (Beecroft Initiative—see page 113), Bosnia, Cambodia, Chad, Djibouti, Ecuador, Estonia, Egypt, Georgia, Jordan, Mauritania, Mozambique, Nicaragua, Oman, Peru, Thailand, Yemen and Zimbabwe.

Practical Exercises

Several practical exercises (PE) are conducted during the course, and students are tested daily by written examination and/or evaluated PE. These exercises follow a similar progression to that of real world mine action operations. The students are tasked to work through a mine contamination problem from initial survey through completion, with everything from mine field accidents to media visits in between. The mine action PE focuses on a specific mined area in the notional country of "Fort Leonard Wood" following a protracted insurgency and is woven into the curriculum throughout the course. According to Col. Barry Shapiro, chief of Joint U.S. Military Advisory Group-Thailand (JUSMAG-THAI), "The Humanitarian Demining Operations Orientation Course has been a key element in the United State's efforts in development of the Thai Mine Action Center [TMAC]. The course has ensured that the U.S. Special Forces instructors and advisors are providing the appropriate knowledge and expertise to the Thai program. Humanitarian demining assistance is an important part of our engagement program with Thailand, and the course has provided a valuable means of maintaining quality control over our efforts."

Training Products

CTSC/HDTC is recognized for production of high quality mine action training aids. The centers develop training products to support mine awareness, countermine and demining activities. Among these training aids are sets of mine information cards for Bosnia, Korea, Rwanda, Mozambique, Eritrea, Ethiopia, Angola, and Central and South America. Each card has a picture of a landmine on one side and applicable technical data on the reverse. CTSC/HDTC has also developed three-dimensional mine boards. Each set of boards is a country, with individual boards showing several landmines found there. In addition, CTSC/HDTC staff assembles demining toolboxes that include demining hand-tools, inert landmines and mine boards. These toolboxes are provided to Special Forces teams deploying to conduct train-the- trainer missions. Finally, CTSC/HDTC produces inert training mines for recognition and familiarization training.

Joe Donahue using a Guartel MD-8 mine detector in the Fort Leonard Wood training lanes. *c/o Joe Donahue*

The Implementers

I attended the HDTC course with an Operational Detachment Alpha (ODA or "A-Team") from 2nd Battalion, 1st Special Forces Group (Airborne), as well as Navy EOD technicians. Based at Fort Lewis, Wash., 1st Group's area of operation is Asia and the Pacific Rim. The members of this "A-Team" have international experience in countries that include Thailand, Korea and Madagascar. The team worked with TMAC for nearly three months from October through December 2000.

Training provided to TMAC included primary first aid for all personnel and advanced medica (paramedic) skills for TMAC medics. General, technical and clearance survey operations were also taught, as were UXO identification and demolition.

The two Navy personnel attending the course were preparing for a deployment to Yemen. Their commanding officer said, "U.S. Navy EOD technicians support U.S. Humanitarian Demining Operations (HDO) worldwide. Following HDTC training, these technicians are normally assigned as team members of larger SOF contingents sent to conduct HDO in such places as Yemen, Thailand, Vietnam and Bosnia. Navy EOD technicians focus upon training-the-trainer, and work with other military forces and NGOs to meet the demining needs of a given country. The experience of HDTC has significantly increased the sensitivity of U.S. Navy EOD operators to the unique needs of humanitarian operations, and specifically, the teamwork required among host nation, foreign military andNGOs to train and educate local forces to create a safe environment."

Numerous SOF personnel have conducted humanitarian mine action rotations since the program began more than four years ago. These deployments typically last for three months and are part of a "building block" approach to mine action training and capacity building. In other words, a deploying team will build its program of instruction upon that of a preceding team, where applicable. One of 1st Group's detachments recently began another deployment with TMAC.

Special operator working in a training lane during a Practical Exercise at HDTC.

Federal Agencies

HDTC courses are open to not only military servicemen and women, but to members of federal agencies and other organizations. Federal Bureau of Investigation (FBI) Special Agent David D. Baker was recently the first FBI employee to attend the Humanitarian Demining Operations Orientation Course. Asked why the FBI perceives a need to send agents to HDTC, he said, "International operational commitments to investigate and collect evidence on terrorism-related attacks against Americans have significantly increased in areas of the world that have mine problems. The FBI saw a need for a more formal safety training program for its personnel."

SA Baker said that although the FBI does not conduct demining operations, the HDTC course "was very beneficial, as it provided the FBI with training on the threat of landmines, mine field recognition and emergency action drills if a mine field is accidentally entered." Now the FBI will be better able to coordinate with military, international and NGOs in

The Beecroft Initiative

To speed the pace of reducing the landmine threat that endangers populations in Armenia, Azerbaijan and Georgia, and to strengthen confidence and security in the southern Caucasus, the DoS implemented the "Beecroft Initiative," an innovative multilateral program. Under this initiative, U.S. military personnel conducted simultaneous humanitarian demining training of select groups of Georgian, Armenian and Azerbaijani soldiers and civilians at a military base in Georgia. They taught their fellow soldiers up-to-date humanitarian demining skills, allowing those trained to serve as force multipliers by returning home to train others. Robert M. Beecroft devised this initiative while he served as Principal Deputy Assistant Secretary in the Bureau of Political-Military Affairs at the DoS, proponent of the Office of Humanitarian Demining Programs.

The DoD Office of the Assistant Secretary of Defense for Special Operations and Low-Intensity Conflict (SOLIC - Peacekeeping and Humanitarian Affairs) is charged with overseeing the U.S. military's "train-the-trainer" program. Under this program, Special Forces personnel train foreign deminers at overseas sites in modern humanitarian demining techniques. To date, approximately one quarter of the world's humanitarian deminers have been trained under this program or at the U.S. Army's Humanitarian Demining Training Center at Fort Leonard Wood, Mo.

The Government of Georgia hosted this innovative training program at the Gori military base near Tbilisi, Georgia. Georgia, Armenia and Azerbaijan each contributed 20 soldiers and civilians (for a total of 60 students) to be educated regarding modern humanitarian demining techniques by 70 U.S. Army demining experts. The 70 U.S. soldiers were primarily Special Forces operators ("Green Berets") from the 10th Special Forces Group. The U.S. contingent also taught the conduct of information campaigns for support of mine awareness education. The HDTC program is logically structured to cover all mine action subject areas, from "digging in the weeds" to national policy. HDTC standard practice is to teach methods and techniques in accordance with the U.N.-administered International Mine Action Standards (IMAS). Blocks of instruction are rotated among faculty members based upon areas of expertise and experience. Students are encouraged to provide input and comment. Because the primary target audience of special operators may not have previous mine action experience, HDTC faculty provide broad background regarding policies, standards, area of operation and the sectoral distinctions between the humanitarian, military and commercial mine action communities. Among the blocks of instruction taught are:

- Global Landmine Situation
- U.S. Demining Policy
- International Demining Organizations (Military, United Nations and NGOs)
- International Mine Action Standards (Under development by the United Nations Mine Action Service (UNMAS)
- National Mine Action Org.
- Survey, Levels 1-3
- Manual Demining Equipment and Clearance Techniques (Equipment, planning and execution, and demolitions (including live-fire)
- Program Management
- Explosive Detecting Dogs
- Mine Awareness
- Mechanical Clearance
- Accident Investigation
- Country-specific Brief
- Public Affairs

The Mineseeker Airship: 'Supporting the U.N.'

The Lightship Group and the Defense Research and Evaluation Agency team up to help survey mine fields from above. Airship completed its flagship mission in 2000.

by Elizabeth A. Cramer, *MAIC*

From October to November 2000, people in Kosovo may have looked skyward and seen the large white airship titled "Mineseeker.com, Supporting the UN." For nearly two months the Mineseeker Airship flew over regions of Kosovo collecting information about the mine fields below. The airship was completing its debut assignment as the first in aerial mine field survey technology. Over the course of six weeks the Mineseeker team collected over 60 hours of videotape and 500 digital images of mine sites, completing the airship's first mission—an aerial optical survey collection of 30 mine fields in Kosovo.

Background

The idea of aerial mine field survey grew from the continual advancement in demining technology. Currently, the most reliable method for clearing a mine field involves manually probing the ground. By this method, a man with a probing device can clear 20-25 m per day. This method is both costly and timely. Experts in demining have been looking for a more time and cost-effective method of clearing the U.N. estimate of 800,000 square kilometers of land that is unusable due to the suspected presence of mines. The United Nations estimates that over 80 percent of the land worldwide currently restricted as mined is actually mine-free. In order to release restricted land for agricultural and residential development, it must first be surveyed. The original objective for an aerial survey was to complete a fast and accurate Level Two survey of the land. The goal of The Lightship Group (TLG) and the Defense Research and Evaluation Agency (DERA) using the Mineseeker is to reduce the land to be mined by 20 percent.

Mineseeker Airship in flight. *c/o The Mineseeker Foundation*

The Lightship Group

TLG was formed in 1995 as a partnership between Lightship America, the operating division of American Blimp, and Virgin Lightships, part of Sir Richard Branson's Virgin Atlantic Group of Companies in Telford, UK. TLG currently operates 17 of 23 worldwide airships, making it the largest operating airship company. The Lightship Airship was created in response to the need for low-cost, high performance airships for both advertising and aerial survey. The group is known for its robust, cost-effective airships. The Lightship crew has combined for over 100,000 hours of flying experience. The Mineseeker Airship is an A60+ lightship that measures 150 feet long and 55 feet tall. With a gondola 14 by 5 feet long, it can hold up to five people.

DERA

The ground breaking new technology that makes aerial radar survey possible is called the Ultra Wide Ban Synthetic Aperture Radar (UWB SAR). The UWB SAR was first developed by the U.K. Ministry of Defense for use in finding AT mines; it was originally intended to find large objects. In the last five years the Defense Evaluation and Research Agency (DERA) has taken over serious

development. The radar is designed to penetrate foliage and ground to create a high-resolution image of metal and plastic mines. The radar was developed to find smaller targets, making it suitable for survey of mines and cluster bomb units (CBUs). The UWB SAR is currently the world's highest resolution radar of its kind.

The Mineseeker Project

In response to the need for more advanced demining technology, TLG and DERA joined together to study the use of airships in humanitarian demining. They began to study the feasibility of joining two technologies, TLG's A60+ airship, and DERA's UWB SAR, to create a mine-seeking airship. Both organizations believe that the airship is the most practical aircraft for aerial survey primarily because an airship is stable, vibration-free and nonmetallic.

An airship has the following features that make it an ideal aerial platform for the use of a sensitive radar system:[1]

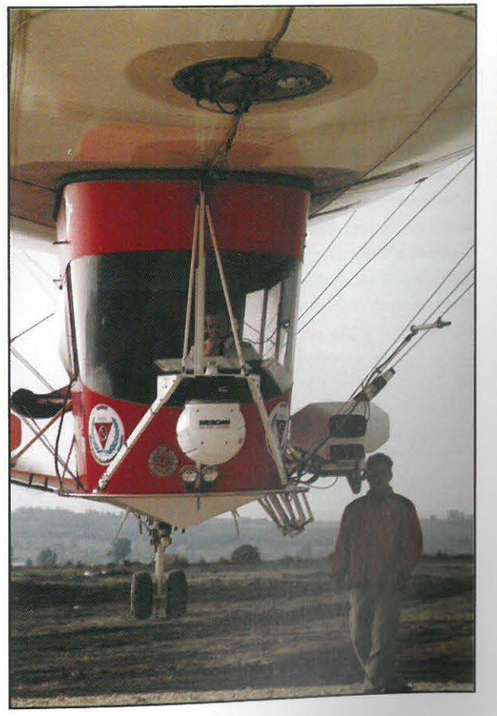
- a mobile, stable platform;
- long endurance;
- low noise and vibration;
- no rotor downwash;
- relatively large payload capability; and
- a good operator environment.

Airships also have a low rate of critical failure. Even when shot at the airship can withstand several bullet holes before it sinks to the ground, never crashing. The payload of the aircraft is also important because the electric equipment can be both heavy and sensitive.

The Lightship Group's A60 airship has a half-ton payload, making it ideal for the sensor equipment like the UWB SAR. Using a helicopter instead of an airship was considered for the aerial survey, but was decided against for several reasons. When working in military zones, helicopters can be perceived as a threat, whereas airships are "friendly" to the public eye. Although helicopters have the ability to hover like airships, they also have rotor downwash, which causes strong downward air pressure that could cause mine detonation.

(l-r) John Flanagan, MACC program manager; Mark Finney, pilot; Sir Richard Branson; Chris Clark, operations manager; Steve Saunders, Mine Action Coordination Center; and Dr Paul Bishop, DERA. *c/o The Mineseeker Foundation*

In January 2000, TLG and DERA officially took steps in their partnership to create and develop the Mineseeker Airship. DERA was already developing a prototype UWB SAR. The development continued until January 2000, when the prototype system was fitted in the Mineseeker airship, a Lightship A60+, recently diverted from an advertising assignment in Germany. The most serious concern that engineers faced was to make sure the radar energy did not interfere with the electrical power of the airship, causing possible airship failure.



Wescam sensor fit. *c/o The Mineseeker Foundation*

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Testing

In January 2000 the first trial run of the Mineseeker was held at a DERA site in Worcestershire, UK. The trials proved promising for the technology,

The Mineseeker crew.
c/o The Mineseeker Foundation

as the radar was able to detect surface metal and plastic mines with at least the accuracy of ground level surveying. With aerial survey, the team detects and maps mines and UXO, including plastic mines as small as 10 cm. The Mineseeker was found to be able to scan an estimated 100 sq. m per second, a dramatic increase from the amount of land that can be covered per second during typical ground survey. By using aerial survey, large areas can be mapped in a short time and mine-free land can then be released for use, eliminating the need for an actual physical search.

Deployment in Kosovo

In order to develop a better overall understanding of the mine problem, the Mineseeker team planned a trip to visit several mine-affected countries, including Thailand, Cambodia and Kosovo. The trip objectives were to meet experienced deminers, discuss the requirements for Level One and Level Two surveys and to gain understanding of specific terrain issues involved in mine clearance in order to give the team a more rounded view of the mine problem and demining techniques.

In August 2000, the team visited Kosovo, where it met with John Flanagan, program manager of the U.N. Mine Action Coordination Centre (MACC) in Kosovo, to discuss current mine clearance. There are two types of ammunition that need to be cleared from the land in Kosovo. One type is landmines laid by Serb armies. During an initial Level One survey, maps with mine field locators were collected from the Serb Army and delivered to MACC. However, the maps do not always make the mine clearance work easier; the information is often incomplete and vague. Mine fields are not GPS referenced and the field locators are physical points such as stone piles, cement walls, or sticks. Using these maps ground deminers may have to prod through large areas of brush or forest to find the locators before they could begin clearing, wasting valuable time.

The other type of ammunition left in Kosovo is the NATO-dropped CBU, a more difficult to detect munition. After some struggle to get clear, often classified information, NATO shared some coordinate maps with MACC. However, the coordinates were often unclear. For example, on some maps are a series of crosses, but there is no specific key to tell what the crosses indicate. A cross could stand for a known mine field or a reported mine field. Without more detailed information, deminers spend valuable time searching in areas that may not contain mines, instead of spending time in areas certain to be mine-infested.

During the Mineseeker team's visit to Kosovo it became evident that there was an immediate need in Kosovo for an aerial observation platform that could be used to pinpoint both landmines and CBU strikes and their UXO. Upon Flanagan's request the Mineseeker team began to prepare for immediate deployment of the Mineseeker to complete an extensive optical survey of the land. The MACC's statement of requirements for Mineseeker were:[2]

- Locate and identify existence of recorded mine fields and identify reference points;
- Confirm extent of mine fields;
- Strategic planning regarding the use of assets (dogs, machinery and access);
- Confirm that fences and mine-markers are still intact;
- Confirm land use and prioritization of tasks;
- Identify CBU strikes with known coordinates, and search for identifying strike areas not related to known coordinates;
- Produce detailed records, define boundaries and enable strategic planning for clearance; and
- Ensure all data collected, where appropriate, is entered into MACC's Information Management System for Mine Action (IMSMA).

Aerial Optical Survey

There were two phases of the Mineseeker work in Kosovo. The first phase of work was an aerial optical survey, begun Sept. 13, 2000. The airship flew over known mine fields and cluster bomb sites using Wescam camera equipment to take detailed photographs of the fields below. For six weeks the Mineseeker flew over 30 mine fields using maps and old sketches to find and zoom in on fields below. Steve Saunders, MACC threat assessment officer, flew with the team during the optical survey. Using previously collected information about mine field indicators, Saunders and pilots Mark Finney and Andy McDonald were able to zero-in on targets to take pictures and make records. By viewing the mine fields from an overhead view, the crew was able to spot mine locators more easily than ground deminers. The locators were then referenced for use by demining teams. From an overhead view, areas of cluster bomb strikes were also more easily spotted and recorded.

One of the greatest challenges in completing the aerial survey was flying the airship so low to the ground. Saunders and the pilot had to navigate hazards such as electricity pylons and mountains that usually were far below the airship. Another concern was that in case of an emergency the airship might have to land near or in a mine field. About this, David Partridge, project director, gives assurance: "In the event of a major system failure or hostile action, airships are remarkably robust and would float to (relative) safety. This aspect has been well researched and formed part of the risk register for our deployment."

Radar Testing

The second phase of the survey was a testing period for the prototype ground-penetrating UWB SAR. The radar was tested over a former mine dog test site—its first trial in an actual mined area. The area was on a hillside in a former war zone, and contained boxes buried with several types of mines and UXO. The test site gave the Mineseeker team a chance to analyze the accuracy and system limitations of the radar. The radar had already proved to be able to penetrate foliage during the testing in United Kingdom. The team wanted to learn more about the highest level of performance of the radar. From testing it was confirmed that the radar can detect plastic and metal mines up to 10 cm below the ground—a reassuring fact for both DERA and TLG. The results of this prototype testing will be used to develop the radar and design tests for future prototypes.

Post conflict battle damage can be assessed for UXO risk, and associated mined areas pinpointed using aerial images and provided military records.
c/o The Mineseeker Foundation

Public Awareness in Kosovo

The Mineseeker team also attempted to promote public awareness of the Mineseeker in Kosovo through a three-part campaign. The team used a three-part method to promote public awareness. The first part was getting local television and radio coverage in the areas of surveying. The media explained that the Mineseeker was there for mine survey and not any type of military action. The second part consisted of sending a mine awareness team to speak with local people to reinforce the positive nature of the project. The third part involved conversing with village elders and inviting them to look at the airship and equipment on the ground at its base. This gave the people a chance to

The canister from a cluster bomb strike identified from 1,000 feet.
c/o Wescam

see the equipment up close and, according to Partridge, probably contributed to the fact that none of the equipment was intentionally damaged while at its base in Kosovo. Dr. Paul Bishop, DERA project director, said that overall media coverage was very positive and extensive and public reaction to the project was supportive.

Kosovo Results

After completing its 103.2 hours of aerial survey the team put its extensive collection of information onto CDs, which were delivered to MACC in November 2000. The CDs contain video footage and still pictures of specific areas of mine restriction. The photographs taken by the airship make visible previously unknown tracks and paths running through the mine field areas of interest—where the tripwires are most likely found. The CDs are available for NGOs for assistance in their mine clearance. Providing NGOs with aerial photos of the land they are demining is considered by Saunders to be the most successful part of the mission. "All the companies we provided with information said it was very useful; so yes, it was a success," Saunders stated.

The results are currently being integrated into the MACC's IMSMA. At the time of the delivery of the CDs, local mining had stopped for the winter, so there was no immediate use for the information in the IMSMA.

Benefits of Mineseeker

Besides completing aerial survey, there are other great benefits to the Mineseeker Airship project—increased global awareness of the mine problem, a move towards commercial sponsorship for humanitarian demining and the positive contribution of military demining resources to humanitarian demining. The Mineseeker has been fully funded by sponsors Virgin Atlantic Airlines, The North Face, Wescam and Linde Gas. Through these sponsorships, the commercial world has been introduced to the mine problem and taken part to help. The Mineseeker Foundation will continue to look for commercial funding to support the project, believing that it is important to keep mine action in the public eye. The commercial support brings new hope that more humanitarian demining support will come from sponsors other than the government and U.N. programs. Mine awareness and support will continue to be raised in both the public and commercial sectors.

This does not discount the benefit of redirecting former military resources and technology towards humanitarian demining. The UWB SAR is the product of many years of development under the Ministry of Defense. "The most significant thing achieved by the Mineseeker is that it is providing media glare, and that we now have the license to use technology that was released from inherent military demining for humanitarian demining," Partridge explained.

(l-r) Mike Kendrick, CEO Lightship Group, Col. Alastair McAslan, Geneva International Centre for Humanitarian Demining; and David Partridge, Mineseeker project director. *c/o The Mineseeker Foundation*

Future Plans

The Mineseeker Foundation was launched on Jan. 27, 2001, as a joint partnership of DERA and TLG and includes patrons Nelson Mandela, his wife Graca Machel Mandela, Sir Richard Branson and Noor-al-Hussein, Queen of Jordan. The foundation will continue to seek commercial support for the Mineseeker project for the next two years of development and for future airships. Under the direction of Chairman Mike Kendrick, the foundation hopes to raise approximately $14 million (£10 million) for the cause. Bishop says, "The Mineseeker Foundation is committed to looking at new technology not just in mine clearance but in mine action, to using the airship for mine awareness." He points out that the Mineseeker can be used for tasks such as road surveys, monitoring the movement of refuges, and even dropping light parcels, should the need arise.

The immediate task at hand is to assess preexisting technology and the potential development of demining technology. The Mineseeker Foundation strives to determine precisely what mine action requires now and what it will require in time. Partridge says that TLG's goal is to make the Mineseeker a cost-effective aid to the global mine action community.

Future plans for the Mineseeker include a two-year development program. The first 18 months will include development to increase the performance of the radar. DERA is currently working on a new technology that would enable the radar to scan the ground surface in layers. With this capability, the team can take a set of pictures of the surface, then take another set at 2-5 cm below the surface, and another set at 10 cm below.

DERA and TLG are also looking into the development of a more complex, automated system to manage the collected data from surveys. Currently, the information is difficult to analyze and can take a long time to be organized. The information is stored by individual mine. However, the ideal management system would provide on the spot, organized output of specific mined areas, in the fashion of an advanced Level Two survey.

After the advanced development stage will come a six-month period of intensive testing. The testing will take place in the U.K. and various other active mine testing sites throughout the world, possibly including Croatia. The Mineseeker team aims to meet the standards of the International Testing Evaluation Program (ITEP) for aerial mine survey. The tests will be done on various types of soil, water content, mines, and detection characteristics. DERA recognizes the importance of testing in actual mined areas in order to prove the capabilities of the radar before it can be deemed accurate enough for extensive use. The Mineseeker team wants to provide at least the same accuracy of current Level Two ground surveys.

After the Mineseeker meets the prescribed accuracy standards, TLG will develop the Mineseeker II. The goal of the Mineseeker Foundation is to eventually deploy five airships, one or two per year. TLG will provide and operate the technology at the request of NGOs, not as a replacement to all current clearance methods, but in hopes of radically improving mine clearance. As Partridge explains about the project, "New technology is important in terms of speeding up demining. But the most important thing is that we are not standing on a soapbox saying 'We've got the answer'; it's not a silver bullet. We've just got a program enhancement system that can be improved and used." With this in mind, the Mineseeker Foundation and its sponsors join the efforts of humanitarian demining with a whole new approach—from the sky. ■

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Koch Mine Safe and the Cordon Sanitaire Clearance Program

Through the work of Koch GmbH and Mine-Tech, the 359 km-long Cordon Sanitaire in Zimbabwe is being demined in one of the first humanitarian demining efforts of its kind.

By Henry Thompson, *RHS Associates*

Background

In 1993, the European Union (EU) funded a survey of the Cordon Sanitaire in Zimbabwe, a series of six border mine fields covering 766 km. The contract for the survey was won by the mine clearance NGO Mine-Tech, who had three months to perform the survey in late 1994.[1] Mine-Tech did not survey all of the mine fields because the fields and a major portion of the adjacent service road had not seen maintenance for two decades. However, maps were available at the Zimbabwean Army Engineer's Headquarters at Pomona Barracks, and Mine-Tech completed the survey and handed over the final report. The report included maps, diagrams and a broad assessment of the problems and difficulties in clearance. While the report also contained some significant inaccuracies, it did present a broad overview of the mine fields.

Of all mine fields, the top priority was a 359 km-long one in the northeastern corner of Zimbabwe. To advise on the tendering process for a clearance contract, the EU hired consultant Patrick Blagden. The European Development Fund provided funding for the project, while the Zimbabwean Ministry of Defence handled financial control and contractual issues. The invitation to tender was issued in late 1997, and was comprised of two contracts: main works (clearance) and quality assurance (QA).

This was one of the humanitarian demining industry's first major contracts offered to international competition for a project of this scale. The issues of assuming risk and the disclosure of information were not fully explored. The Zimbabwe Ministry of Defence, as the client, provided the bidding companies with very limited information, while the tender documents defined the scope of work as the clearance of 10,000,000 m^2 of mine-infested land in 18 months. It also required the bidding companies to bid with a fixed price.

Six companies expressed interest in performing the clearance. Mine-Tech was one of the companies allowed to bid—an unusual action for a company that performed the initial survey. The bidding companies were allowed to visit the mine field at the Mukumbura end for two days under the supervision of the Ministry of Defence, but high vegetation hid much of the visible detail within the mine field. Four companies (Mine-Tech, Koch GmbH, Royal Ordnance and Mineclear) then presented technical accreditation and bids that were judged by a technical threshold and by price.[2] Koch made its bid in partnership with Mine Safe, a Zimbabwean company owned by retired Zimbabwean army officers.

"The mine field was fenced on both sides by a game fence of three strands of steel wire supported on thin steel posts set in concrete and was cleared of vegetation... By 1997, virtually all the fencing had been removed by local people or had disintegrated."

c/o Henry Thompson

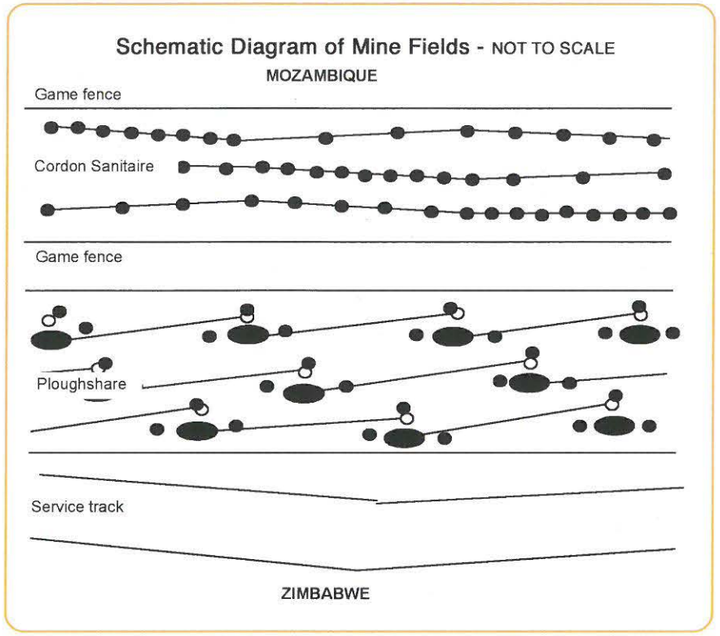
After passing the technical pre-qualification, Koch Mine Safe (KMS) won the contract with the lowest bid. And while Koch couldn't provide a performance guarantee, it was successful in finding backing for deployment from a major Dutch salvage and dredging company, Royal Boskalis Westminster NV, a group that owned the German subsidiary company Heinrich Hirdes GmbH, an EOD company. The QA contract was issued to BacTec.

The Cordon Sanitaire

The Cordon Sanitaire mine field consisted of a 25 m-wide strip of ground laid with three rows of blast AP mines at a density around 5,500 mines per kilometer. The mine field was fenced on both sides by a game fence of three strands of steel wire supported on thin steel posts set in concrete and was cleared of vegetation. The bottom strand held a thin wire mesh game fence. Also attached to the fence was an intruder alarm system linked to control points that fed information to patrol teams. By 1997, virtually all the fencing had been removed by local people or had disintegrated. Three lanes of mines were laid using knotted ropes. Within the three rows, patterns were only discernable over short distances. The majority of mines in the Cordon Sanitaire were the South African R2M2 and the Portuguese M969. The Italian VS50 was also laid. Due to breaches of the mine field and animal incursions, there was a good level of in-filling with more random patterns and different landmines.

The Cordon Sanitaire was backed for most of its length by a second "ploughshare" mine field containing three rows of large fragmentation mines mounted on pickets one meter above the ground. The fragmentation mines were laid with 30 m tripwires and three additional blast mines protected each mine. The mine density in this field was around 100 fragmentation mines and 300 buried blast mines per kilometer. The rows were unevenly spaced and the vegetation was not cleared, so the mine field contained substantial trees and dense thorn bush. The field was subject to a great deal of in-filling and randomly spaced APLs, and had a service track running behind and parallel to it to allow patrolling and maintenance. Amazingly, the Cordon Sanitaire was even found to run up to 8 km into neighboring Mozambique —indicating the hasty nature of its deployment.

Under its contract, KMS was restricted to three working teams, though mechanical methods were allowed only if the land was manually checked. The contractor had to ensure that environmental damage was minimal.



c/o Henry Thompson

The Clearance Operation

KMS planned to deploy its clearance operation in October 1998, but it actually deployed six months late at Mukumbura in March 1999. The mine clearance outfit experienced problems assembling manual teams because the available pool of experienced deminers in Zimbabwe was minimal, meaning KMS had to do more training than anticipated. As a result, there is now a small outflow of KMS-trained deminers joining other companies. Also, in March, Alistair Craib gained control of the demining operation from Patrick Blagden and made his first visit to the project.

After an initial halt to reassess procedures following some early accidents, work recommenced in April 1999, and clearance efforts moved slowly for four months. Metal contamination forced clearance rates

NOTES FROM THE FIELD

Asia & the Pacific

Minebuster takes to a mine field. *c/o Andy Smith*

Minebuster griddle-rack from the rear. *c/o Andy Smith*

to be about 30 m^2 per two-man lane per day. By the end of May, eight months into the contract, 0.25 percent of the 10,000,000 m^2 of land had been cleared. Efforts were then further slowed by heavy rainfalls, which led to outbreaks of cholera and the suspension of work by local health authorities. Due to the *force majeure*, KMS was granted a two-month extension to its 18-month contract. Meanwhile, BacTec had deployed on schedule in October 1998, but was in trouble because its contract had been negotiated on the basis of payment per unit of land verified.

More flaws in KMS's bid and the terms of the contract arose early in the process. The deminers were spending the bulk of their time locating false signals from pieces of scrap metal in the mine field.[3] This scrap metal came from the remains of fencing and rubbish found in the mine field. The demining company had originally estimated the level of contamination at one false alarm per 20 m^2 and had worked this estimation into its bid. In reality, though, it was finding up to 30 signals per square meter in close proximity to fence lines.[4]

The contract does not specify clearance of all metal but requires clearance to U.N. standards of 99.6 percent of mines removed down to a depth of 20 cm. In practice, KMS cleared all metal from the center mined lanes and was encouraged by the Zimbabwe Ministry of Defence and BacTec to clear all metal, which makes area verification a much simpler task. However, the deminers had underestimated the logistical difficulties of the operation. The soil in winter is very hard, so by July 1999, the manual teams required 7,500 liters of water per day to water the mine field

before prodding or excavating. KMS also had to build access roads to the mine field. The Mine-Tech survey document (and subsequently the Ministry of Defence contract) specified that there was a service track running about 50 m behind the mine field. In reality, the track was between 300 m and 1.7 km from the mine field and no longer existed in certain areas.

Safety

KMS was also strongly criticized for a high accident rate. From March to June 1999, 12 accidents occurred. Over half of the accidents were incurred during excavation. The primary cause of one-third of these was attributed to management error, notably serious injuries from handling mines.[5] A total of 20 people were injured in 18 accidents from February 1999 to July 2000. Two of the seriously injured subsequently died in the hospital—one from pneumonia contracted in recuperation. Only one accident occurred as a result of stepping on a deep-buried mine on land not yet offered for QA.

The accidents show a number of clear features:

- Only one deminer was seriously injured while clearing mines *and* adhering to all Standard Operating Procedures (SOP);
- Nine out of 14 (64 percent) of those injured were back at work within 10 days of the incident;
- The two fatalities both occurred off-site and under medical care; and
- No one was killed or injured by a ploughshare fragmentation mine (no ploughshare mines were found intact with detonators).

Two of the serious handling incidents were partly the result of mine neutralization (taking the detonator out of the mine casing), a procedure that was specified as a SOP under the initial contract. More than 4,000 mines were disarmed in this way, but following a review of SOPs, the practice was abandoned and, henceforth, all mines were destroyed intact.

One way of assessing accidents in mine clearance is to look at the density of mines and UXO (based on the fact that no mines and no UXO equals no accidents). KMS's teams were handling very large quantities of minimum-metal APLs under a broad range of conditions, including excavating them from down to 35 cm—well beyond the depth required by U.N. standards.[6]

In May 1999, Craib recommended a change in management. As a result, Herman van der Vorm was appointed to replace the previous program director. The appointment proved an immediate success as critical management decisions were implemented and efficiency improved rapidly. By August 1999, the project was operating productively and safely. In September 1999, KMS also introduced alcohol (Breathalyzer) and drug testing and a pay increase.

Mechanical Clearance

Soon after deployment in March 1999, KMS explored the potential for mechanical clearance and commissioned an environmental impact assessment of mechanical clearance of the Cordon Sanitaire mine field. The study concluded that approximately one-third of the mine field was suitable for mechanically assisted clearance, one-third was suitable for clearance with following remediation to reduce erosion and one-third was not suitable for mechanical clearance.

KMS subsequently purchased a Veilhaben Minebuster. The 56 ton machine arrived in Zimbabwe in July, at which point it was renamed the "Mine Collector" and was tested and evaluated to develop working parameters SOPs. These procedures were put into operation in October 1999. Two of the demining teams remained as manual teams working on the ploughshare mine field, and the third team followed the Mine Collector.

The Mine Collector is like a heavy potato harvester built around a crawler tractor with a heavy mill added before the lifting and sifting apparatus. This machine can process a 3 m-wide swath down to a depth of 50 cm. Soil is mixed up by a carbide-toothed grinder and deposited onto a set of three large nylon-finger rollers that break up clods of earth and separate out solids from loose soil that escapes through the rollers. Any solid items such as stones, roots and mines are deposited on a slatted conveyor that deposits them back on the surface some 7 m behind the front mill. Mines and UXO are left on the surface, ready for the manual teams. It was found that roots of some trees would be picked up and bound in the nylon rollers, so working depth (and forward speed) is partially varied according to vegetation. In practice, the Mine Collector works behind two other machines: a bulldozer that removes trees and shrubs and a heavy mine-protected tractor with steel wheels and a ripper that loosens soil and breaks up roots.

Grinding teeth and nylon finger rollers of the Minebuster. *c/o Andy Smith*

When running efficiently, the machine processed 12,000 to 15,000 m^2 of land per day. When following the machine, individual deminers could process 400 to 500 m^2 per day—about 10 times the normal manual rate per person. The Mine Collector ran successfully for a few weeks until the heavy rains returned. The Mine Collector broke down on a number of occasions and several frustrating weeks were spent awaiting spare parts from Germany. From March to May 2000, the productivity declined significantly due to downtime.

Productivity

In February 2000, 17 months into the 18 month contract, the KMS management team looked at its prospects. The teams had cleared less than one-third of the contract area (2.6 million m^2 out of a total of 10 million m^2). The need for a contract extension became obvious. Luckily, the EU and the Zimbabwe Ministry of Defence agreed to extend the company's contract to February 2001.

The Journal of Conventional Weapons Destruction, Vol. 5, Iss. 1 [2001], Art. 1

Asia & the Pacific

Comparative densities of mines and UXO in clearance operations in the region:

Region	Square meters	Mines/UXO removed	Square meters per mine/UXO
Koch Mine Safe	3,809,281	65,185	58
NPA, Songo, Cabora Bassa	738,180	12,072	61
Mechem, Massingir	89,634	349	467
Mechem, Corrunana Dam	1,700,000	3,600	472
Mozambican average			1,500 - 2,500

Source: Mechem, NPA Mozambique, Quarterly Report 4th Qtr, 1999, Koch-Mine Safe, IND, Maputo.

Working under extended hours, the mechanical team was capable of bringing the company up to between 6.5 to 7.5 million m^2 of land by February 2001. The Mine Collector processes 20,000 m^2 of ground per day, and the manual team covers around 12,000 to 12,500 m^2 per day, potentially destroying over 1,000 mines per day.

On average (over both mine fields), KMS's teams are lifting and destroying one mine per 58 m^2 of ground. In the Cordon Sanitaire mine field, this broad average rises to one mine per 20 m^2. The mechanical team working in the center of the Cordon Sanitaire clears one mine per 12 m^2 *on average*—spot densities can be more than double this figure.

Two things characterize the current clearance program:

• *The high density of mines and number of mines being cleared.* In June 2000, KMS cleared 421,000 m^2. By mid-July 2000, the team had cleared a total of 3,809,281 m^2 of land and 65,185 mines—one mine per 58 m^2. By any standards, the current safety record of KMS is exceptional considering the conditions.

• *No "missed mines" have been reported by BacTec, which assesses 10 percent of the land cleared.* The level of quality achieved under these conditions is very high. ■

"KMS was also strongly criticized for a high accident rate. From March to June 1999, 12 accidents occurred. Over half of the accidents were incurred during excavation. The primary cause of one-third of these was attributed to management error, notably serious injuries from handling mines.[5]"

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[3] Koch-Mine Safe was using Vallon detectors, fine German detectors capable of high sensitivity—but more complex to use than many comparable models. The QA team was using British Guartel MD8 detectors, a robust and simple model.
[4] Temba Kanganga, Mine Safe, Deputy Project Manager. *The Road Forward: Humanitarian Mine Clearance in Southern Africa.* SAIIA Johannesburg, August 6, 2000.
[5] Data from Andy Smith, DDIV database, April 6, 2000.

Mine Detection Dogs At Work

continued from page 87

the [dogs'] ability to detect plastic mines when metal detectors are ineffective is even more important."

The Global Training Academy has the capacity to train 30-36 dogs per year in mine detection. In 2001, 18 dogs will be trained for deployment in Lebanon, Oman and Thailand. In addition, the Academy currently has dog teams working in ten countries: Mozambique, Rwanda, Bosnia, Costa Rica, Honduras, Nicaragua, Croatia, Namibia, Thailand and Afghanistan. These dog teams often work with the host country's military in mine clearance operations.

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M-Detect

M-Detect, a mine dog training facility in Germany, specializes in training MDDs for mine detection operations in mine-affected countries. Each year, M-Detect trains and deploys approximately eight dogs. This year, MDDs are being trained for deployment in Bosnia-Herzegovina and Croatia. Martin Weitkamp, director of M-Detect, said MDDs are "an important part of the international demining toolbox" if used as quality assurance in unknown areas. Weitkamp adds that dogs should not be used in a known mine field in place of deminers or demining machinery but in unknown areas where sweeping the fields with an MDD is faster and more efficient.

■ The training period ends with MDD leading the trainer. *c/o Martin Weitkamp*

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Conclusion

MDDs are an effective means for mine clearance operations worldwide. With proper training from mine dog companies and organizations, MDDs employed in mine-infested countries return successful results. Their driven success continues to be an asset to countries in times of need. ■

The Direct Approach from Kosovo:
Mine Awareness Education

HMD Response's Philip Dive sees the inherent value in the direct approach in mine awareness training and urges the mine action community in Kosovo not to look past this approach.

By Philip Dive, *Senior Mine Awareness Educator*

Collectively, the managers of mine awareness education programs (MAEP) have helped the people of Kosovo focus on the mine threat through a complex web of approaches. These approaches include child-to-child, soldier-to-child, mother-to-child, puppet theaters, road shows and summer days. Other MAEP initiatives utilize soccer players and mosque Imans as the messengers of mine awareness. Still another program educates teachers about mines in preparation for the arrival of mine awareness in school curriculums. All of the above programs have been accredited by the U.N. Mine Action Coordination Centre (UNMACC), and together form one of the most comprehensive mine awareness packages in the world.

Among all this creative, progressive and radical thinking, there may be the danger that the so-called "direct" approach has been made redundant in the rush for an "interactive" MAEP. The direct approach simply explains the situation concerning nearby mine fields and offers advice on safe behavior to the adults of a community in the hope that they and their families can avoid these areas until demining agencies are able to clear them.

While the initial estimates for landmine clearance in Kosovo predicted that UNMACC would be busy for many years, more recent studies lean toward a less pessimistic outlook, perhaps requiring only another year to clear the vast majority of mine fields. After January 2001, it is calculated that only about 20 percent of the known mine-affected areas will remain. All of these locations are in the mountainous border areas. In Kosovo, the highest-risk groups tend to be men—usually young agricultural workers—who live non-technical, rural lives. For this group

HMD RESPONSE
MINE
AWARENESS TEAM

the direct approach is the only guaranteed way to exchange mine-related information and therefore should form the foundation for a national strategy.

This article acknowledges that during the evolution of a MAEP the direct approach often lacked sensitivity to local concerns, tended to be "ad hoc" and offered no alternatives to help change people's risky behavior. These concerns focus on the lack of management during the early programs, rather than the innate potential of the direct approach itself. To be fair, though, any approach will fail if poorly implemented. As for viable alternatives, I know of no current program, direct or community-based, that actually offers the people of Kosovo a sustainable second option that allows for a real change to their daily mine-affected routine.

The MAEP presented by HMD Response in this article views the simplicity of the direct approach to be of lasting importance because mine awareness does not need to be complicated. The direct approach can demonstrate a very high level of awareness of local conditions and can be swift to implement. With competent management, the direct approach can also be easy to administer, control and evaluate.

THE DIRECT APPROACH-A MAEP OUTLINE

Program Location

HMD Response's MAEP is located in the Municipality of Dragash in the south of Kosovo. Dragash is linguistically, politically and culturally divided into two parts. Its' 34,000 residents are divided into the Albanian speaking majority residing in 19 villages to the north (an area called Opoja) and the non-Albanian speaking minority (the Goranis) who live in 19 villages to the south. Within the mountains that surround Dragash, many of which reach altitudes of up to 2,500 meters, these 38 villages coexist with few points of contact other than their faith in the Koran.

Purpose

HMD Response MAEP exists to help the people of Opoja and Gora to avoid becoming casualties of mines and UXO through education, awareness and other relevant information.

Structure

The program consists of four elements:
1. Information Center
2. Village Mine Education Teams
3. Clearance Information Liaison
4. Mine Awareness Truck

Activities

Static Display:
Provide a static UXO and mine display for the public to visit at any time.

IMSMA Maps:
Inform the public of known UXO and mine locations.

Dangerous Area Reports:
Process UXO and mine information provided by members of the public.

Materials:
Design, test and produce additional and appropriate UXO and mine awareness materials.

Establish dialogue:
Talk with president and/or religious leader.

Data Gathering:
Compile a questionnaire to find out the local level of mine awareness.

Group Presentation:
A 25-minute formal presentation.

Mingle:
A three-hour village visit stopping people in the street/coffee bars to discuss the mine situation.

Liaison:
Visit demining operations.

Information Exchange:
Help both the demining organization and the public with the exchange of mine related information.

UNMACC:
Completion of UNMACC forms clarifying public awareness of clearance operations close to their homes.

Maintain Public Interest:
Use a 4-ton truck as a large mobile platform from which mine related information is offered to the public. The truck is parked at sports events, market places and busy road junctions.

Curriculum

Through the four program elements the public should be able to do the following as a result of the HMD Respomse MAEP:

Respond to the mine/UXO threat:
- Be able to recognize dangerous areas through warning clues.
- Be able to recognize mine fields through the presence of warning signs.
- Be able to take appropriate action after realizing that you are in a mine field.

From 38 villages, 600 mine awareness quesionnaires were collected for program evaluation purposes. This will be repeated in May 2001 as an indicator of the program's impact.

Understand safe behavior:
- Understand that the best solution is to stay out of mined areas.
- Understand that safe paths must be used at all times.
- Understand that mines and UXO must not be touched.
- Be able to recognize above ground and below ground mines.
- Be able to recognize cluster bombs and grenades.
- Be able to recognize ammunition, fuses and rockets.

Know the local mine field situation:
- Know the agencies that are demining Dragash.
- Know the locations of mine fields in Opoja and Gora.
- Know that mine warning signs must be left in place.
- Know that clearance is a slow and dangerous activity.

Management

The above results are implemented via three sequential objectives:

Sequential Objectives

1. Organize, equip and train a specific team for a public information program in the Dragash Municipality.
2. Implement a public information program that is focused on MAE to the many communities within Dragash.
3. To depart from Dragash in an organized and planned manner ensuring that, where possible, non-technical tangible assets are disposed of in the best possible way.

Each objective has associated performance indicators that are tested by the director of HMD Response during his three planned visits to the program. These verification visits are copied to our donor.

The Journal of Conventional Weapons Destruction, Vol. 5, Iss. 1 [2001], Art. 1

Team Size

The program employs the following:

Position	*Nationality*
Kosovo Programme Manager	English
MAEP Coordinator	English
Opoja Team Leader	Albanian
Gora Team Leader	Bosnian
Opoja Team:	
MAE Teacher	Albanian
MAE Teacher	Albanian
MAE Teacher	Albanian /Turkish
Gora Team:	
MAE Teacher	Gorani
MAE Teacher	Gorani
MAE Teacher	Gorani
Artist	Gorani
Center cleaner	Gorani
Guard	Albanian
Guard	Albanian

The two MAE teams deploy under the supervision of their team leaders. From Dragash the teams go to their areas to undertake the sequential tasks shown below. Each village has its own file and as the tasks are completed within each location, the relevant boxes are checked off. A task can be repeated several times if deemed necessary by the team leader. The MAEP coordinator monitors the teams through unannounced visits throughout the week.

Village Name

1.Visit president
2.Data collection
3. Leaflets
4.Informal mingle
5.Formal presentation
6. Truck visit
7.Clearance briefing

HMD Response mine awareness coordinator formal presentation. HMD Response teachers demonstrate parts of packing boxes in a village from the Opaja area.

In addition to this simple program structure, four more complex issues are now addressed: political awareness, local capacity building, clearance integration and program evaluation. These have been chosen because they are areas of weakness often associated with MAEPs, irrespective of the chosen approach.

Political Awareness

Since the conflict touched Dragash there has been a steady outflow of Goranis. This is due to security concerns following their suspected compliance with the Kosovo Serbs, and for economic reasons as they are becoming increasingly isolated and economically limited.

The Albanian border to the west also adds to security concerns as cross-border smuggling of guns, drugs and girls has become a viable source of income to many entrepreneurial villagers who have a love-hate relationship with the new U.N.-financed administration.

UNMACC was concerned that many NGOs working in the south were recruiting mine awareness trainers that were exclusively Albanian. Not surprisingly, its delivery of MAE in whatever form was biased towards the Albanian majority. This situation had become unacceptable within a U.N. administration that promotes equal access to information and human rights to all the citizens of Kosovo. HMD Response was tasked with remedying this imbalance within the Dragash Municipality. One option was to recruit Goranis and target only the Gorani villages. However, this would have been a mistake as we considered a neutral position to be both politically correct and physically safer. A better solution was to run two teams alongside each other—a team of Albanians and a team of Goranis. Although two teams ensured our neutrality and guaranteed access to all the communities across Dragash, it did raise the potential for internal conflicts within our own organization. In part because of the following actions that we took at the very start of our program, we experienced few conflicts:

- ***Integration with other neutral agencies.***

Advice was requested and noted from the Organization for Security and Cooperation in Europe (OSCE) prior to the selection and training of local staff. The OSCE field office was asked to help us recruit suitable people from both the Albanian and Gorani communities. Also, other agencies were given the opportunity to make recommendations, such as the Red Cross, HANDIKOS and the Balkan Peace Team. Through these liaisons, HMD Response was able to obtain the support of organizations that were already respected by both communities.

- ***Location of the program office.***

After long negotiations with the Dragash U.N. Administered Council, HMD Response was allocated office space within the municipal administrative building of the education department. Located in the same corridor as the director for education, we can be clearly observed working alongside the existing civil structures of the municipality. The town of Dragash is also the political and economic focus for both Albanians and Goranis, so any other location, be it to the north or south of Dragash, would have been totally unacceptable.

- ***English as a core office language.***

All the teachers passed an English test before being recruited, allowing our office to be an English only area. This ensures that everyone understands all the discussions and that no single linguistic group can dominate the proceedings. This also eliminates the need to use interpreters in the office, helping the international staff assess developments quickly.

- ***Mine awareness materials.***

In keeping with earlier observations, the vast majority of posters produced within Kosovo are written only in Albanian. For the Gora team it was necessary to translate existing posters into local languages.

- ***Mobile displays.***

When using our 4-ton truck as a mobile platform for mine awareness education in the multi-ethnic town of Dragash, it is necessary to deploy representatives from both teams at the same time. This is important to ensure that both communities feel they have equal access to mine-related information. It is encouraging to observe our teachers openly working alongside each other, mixing and teaching across ethnic groups. The local representatives of OSCE and the U.N. administration have praised their example.

- ***Avoidance of political rallies.***

We plan our visits schedule several weeks in advance and try hard to stick to our program. Often, however, political gatherings sometimes clash with our visits. When a clash occurs, the teams are under strict instructions to leave the village and return to the office. This avoids any unintentional association with a political party.

The two teams have learned to work together and provide a good example to those who continue to express pessimism about the future of a culturally divided Kosovo. Within their own communities they are communicating effectively and ensuring that mine awareness education can take place without any unnecessary political/ethnic distractions. This has been achieved because we approached the two communities in a manner appropriate to their situations and retained our sense of balance.

While other direct approach MAEPs may have lost their sense of balance, HMD Response has been very careful not to do so. This suggests that failure to be politically sensitive is a fault of program managers, rather than an inherent flaw in the direct approach itself.

Local Capacity Building

As a part of the former Yugoslavia, Kosovo's education, training and management style was summed up by the Soviet doctrine "order is preferable

A 4-ton truck is used as a mine awareness platform and focal point in town centers, at busy crossroads and during sports events.

to change because change infers a risk." Many agencies in Kosovo, both large and small, usher in well meaning albeit fundamentally new ways of working immediately upon arrival in Kosovo. To ensure "appropriateness" and to aid local capacity building, local staff are quickly hired, trained and returned to their local communities with progressive methodologies that may or may not be fully understood either by the staff or the recipient communities. The lack of employment opportunities and the cultural acceptance of the all-knowing "boss" will ensure that teaching takes place even if learning does not result.

To its credit, the direct approach is immediately transparent to suspicious people who are in a state of total upheaval, where change is frightening and Western organizations are slow to reveal their funding and possibly their hidden agendas. All too often, those who criticize the direct approach's lack of sensitivity miss a far deeper concept—gaining the trust and respect of the local population by giving them the information they want in a manner that they recognize as agenda-free.

For HMD Response, the direct approach has enabled strong-minded international members of staff to quickly establish an ordered program that is objective-led, tightly focused and immediately understood by the local members of staff. From this starting point local members of staff feel confident to take some responsibility within a highly structured program that they are able to culturally endorse. The positions of team leaders and that of office managers were not advertised, but rather internally appointed from the initial mine awareness education teachers within our own pool. The professional growth of the team leaders and the office manger in the second half of our program is a mutually beneficial, realistic "capacity building" goal. These three individuals will very soon be running the program for short periods in the absence of the two international managers who will be needed to assess other proposals for MAEPs.

Concepts like authority, autonomy and trust are all inexplicably contained within the concept of capacity building and they are achieved slowly with very small steps. Random MAEPs, typically with only 12 months of funding, cannot expect to have the impact of long term developmental agencies such as Voluntary Services Overseas (VSO) or the Peace Corps, who hope to observe local human resource advances over a period of two or three decades. If any capacity building can occur within short, isolated MAEPs, it would probably be an improvement of existing methods, rather than newly developed teaching methods.

Clearance Integration

Mine clearance and mine awareness must be integrated. Agencies that work in the same geographic areas on these activities need to talk to each other, exchange information and follow agreed upon procedures to ensure that the local people are given every opportunity to stay safe. HMD Response has been able to establish a good relationship with the clearance companies working in the south of Kosovo for the following reasons:

• HMD Response prioritizes work that relates to assisting clearance operations. UNMACC procedures insist that clearance operations require mine awareness be undertaken in nearby villages before, during and after the demining has taken place. For HMD Response, these villages immediately become the main focus of our activities and due to the simplistic nature of our approach, we can react within hours of being informed of a new clearance operation. Also, the rapid checking and processing of "Dangerous Area Reports" that are received from the villagers are given top priority. In both cases, we try to emphasize a service philosophy.

The technical supervisor for the charity HELP briefs the awareness teams from HMD Response on the location and types of mine fields along the Albanian border.

• HMD Response invited demining agencies to help in our training course for local staff. Deminers and medical teams from demining companies within our area taught our awareness teams about the technical aspects of their work, which was followed up by several educational visits to clearance operations. When information concerning a clearance operation is gathered for a village briefing, we encourage our teams to talk directly with the deminers in order to prevent any misunderstanding. The cross checking of IMSMA maps is now a standard procedure. This physically puts our staff alongside the deminers and alongside the mine fields. Without such visits, our credibility with the demining companies and the local people would be lost.

In short, HMD Response is implementing a program that clearance agencies can relate to very easily. Deminers tend to view the direct approach as a clear and simple way to deal with a clear and simple problem—a view that HMD Response in Kosovo accepts.

Evaluation

In each village about 20 adult interviews are carried out before any MAE teaching occurs to better understand the aptitudes and previous knowledge of locals. The interview subjects are always asked if they wish to be interviewed and no attempt is made to challenge those who decline. A trained member of HMD Response staff is present throughout the entire interview. The questionnaire forms the basis of the discussion, and the questions are read out slowly and clearly and repeated as often as the subject requests. The interviewer is allowed to explain the questions to the interviewee if necessary. The interviewer checks the appropriate responses as the discussion takes place.

At the end of the discussion, the interviewer shows the completed questionnaire sheet to the interviewee and checks that the answers are a fair reflection of the interviewee's responses. If the interviewee has made mistakes, then those questions are discussed again and, where necessary, HMD Response staff will explain the reasons for the corrected answers.

Prior to going into the villages, HMD Response staff practiced their interviews with OSCE staff members at its NGO Resource Centre in Prizren. These practice sessions served to check and modify the draft questionnaire; ensure that HMD Response staff understood the need to explain any corrections to the interviewees after the interview; and to adjust the approaches and styles of all the interviewers so that they presented the questions in a similar manner.

The final questionnaire was carefully prepared in English, Albanian and Gorani. See *Annex A* for the English version.

Every village in the Dragash Municipality has now been visited and 600 interviews have been recorded. The results have been analyzed and are displayed in our information center in Dragash.

In May 2001, HMD Response staff will return to these villages and undertake the same number of interviews using the same questionnaire in order to make a before and after comparison. The outcome of this comparison will form the basis of a report that will evaluate the effectiveness of our MAE teaching.

To organize 600 interviews in 38 different villages requires good management and far-sighted vision, something that UNICEF and the Landmine Monitor have both recently recommended for all MAEPs.

Conclusion

All MAEP approaches have a place within the mine action toolkit, and no single approach can offer all the answers to every situation. However, if managed well, the direct approach can make an important contribution.

In Kosovo, the direct approach can be used even when the normal routines of children and adults are disrupted. It also has the potential to reach high-risk groups, in this case young men and adult agricultural workers, who do not typically interact in conventional social structures.

The direct approach should not be disregarded because it appears to be too easy, too cheap and too simplistic. If a good Needs Assessment exercise leads to the outcome that a direct approach will be the most effective and efficient solution for a particular landmine problem, then a direct approach should be utilized and respected as a reliable commonsense approach.

This article has been written to give the direct approach renewed credibility at a time when many MAEP managers may be opting for unnecessary, albeit innovative, complexity in mine action. ■

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All photos courtesy of the author.

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Annex A:
HMD Response MAEP QUESTIONNAIRE

1. Age

a) 16 - 24
b) 25 - 34
c) 35 - 44
d) 45 - 54
e) 55 - 64
f) 65 plus

2. Home village: _____

3. Sex: Male / Female

4. Please describe the signs that are put on either wires or on poles to warn people of an area that contains landmines. (interviewer ticks as appropriate)

a) No Idea
b) Red Triangle
c) Skull and crossed bones
d) VJ sign with "Mine" painted on wood.
e) White, yellow, red tape
f) More than one sign described
g) There are no mine signs

5. Please list the possible clues / items that may help you to realize that you have ventured into a dangerous mined area. (interviewer checks as appropriate)

___ 1. Exposed mine
___ 2. Trip wire
___ 3. Fuses
___ 4. Safety pins
___ 5. Mounds and hollows
___ 6. Bullet casings
___ 7. Dead animals
___ 8. Packing boxes
___ 9. Military clothing

6. How many times have you been educated about the threat of mines by professional mines awareness teachers in the last twelve months?

a) once
b) twice
c) three times
d) four times
e) five times
f) more
g) never

7. Have you observed / studied a map that shows you the locations of the mine fields in the Dragash Municipality?

___ Yes
___ No

8. If you have unfortunately walked into a mine field please select that best action to take. (interviewer ticks as appropriate)

a) Slowly and carefully re-trace your steps.
b) Stay still, warn others and call for help.
c) Find a long stick to check the ground and slowly find a safe route out.
d) Run very fast back the way you came into the minefield.

9. If you find an item that you do not recognize but guess that it is maybe something that was left by a person within the military, probably during the conflict, what is the best action to take? (interviewer checks as appropriate)

a) Remember its location and tell UNMIK police or KFOR.
b) Pick it up and take it to UNMIK police or KFOR.
c) Just leave it and forget about it.
d) Pick it up and show your friends who served in the military and try to find out what it is.

10. In this area the problem of landmines is which of the following:

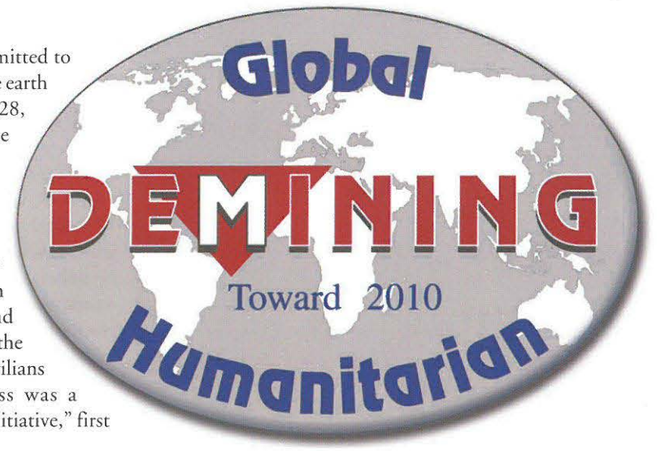
a) A big problem
b) A problem
c) A small problem
d) No problem

U.S. Office of Global Humanitarian Demining Works Toward Demining 2010 Goals

Since 1994, the United States has committed approximately $400 million to worldwide humanitarian demining efforts. With its sights set on 2010, the U.S. Office of Global Humanitarian Demining is working to establish partnerships in the private sector.

By Elizabeth Cramer, *MAIC*

The United States has long been committed to the universally shared vision to rid the earth of the threat of landmines. On Nov. 28, 2000, U.S. Special Representative of the President and Secretary of State for Global Humanitarian Demining Donald K. Steinberg addressed the U.N. General Assembly, outlining U.S. Global Humanitarian Demining (GHD) plans for 2001. The plans include nearly $100 million (U.S.) in funding for the upcoming year, and continued work with over 36 nations toward the goal of making the world "mine safe" for civilians by the end of this decade. The address was a continuation of the U.S. "Demining 2010 Initiative," first announced in 1997.



Demining 2010 Initiative

On Oct. 31, 1997, former Secretary of State Madeline Albright and former Secretary of Defense William Cohen jointly announced President Clinton's "Demining 2010 Initiative," with the goal of creating a mine safe world by the year 2010. The initiative was created in response to the severe threat to civilians posed by landmines. In 1997, it was estimated that 100 million landmines in over 64 countries cause about 26,000 casualties per year. The goal of the 2010 Initiative is to accelerate demining efforts, increase international coordination, and increase public and private resources dedicated to demining.

The initiative included several elements. The first element of the initiative was the appointment of a Special Representative of the President and Secretary of State for GHD and the creation of the Office of the Special Representative to oversee the 2010 Initiative. One element was a conference held in Washington D.C. in May 1998, to develop specific goals and strategies for achieving the initiative. The most obvious element was the continuation of U.S. funding, with the United States committing $80 million for 1998, a two-fold increase from its $40 million in contributions in 1997. The final element was to encourage and support public-private partnerships to augment government and international organization activity.

Creation of GHD

The Office of the Special Representative for GHD and the new position of special representative of the president and secretary of state for GHD were established in October 1997, with the announcement of the Demining 2010 Initiative. Assistant Secretary of State for South Asian Affairs Karl F. Inderfurth was assigned as the first special representative.

The position of special representative was designed to provide the international demining community with a coordinator to bring together donors, deminers, landmine accident survivors and mine victims with governments, international organizations, NGOs, and the private sector

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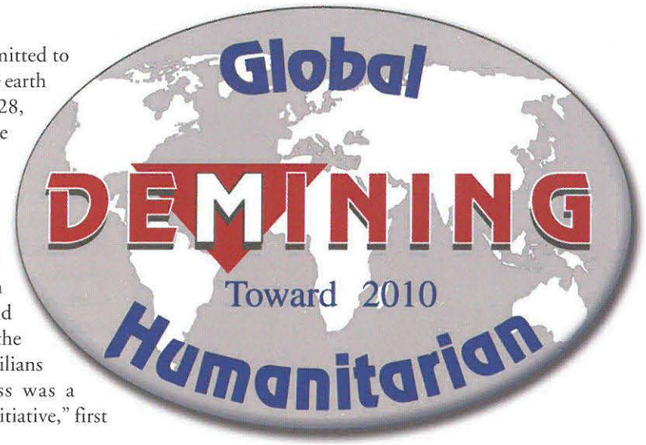

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to improve the effectiveness of the global humanitarian demining effort.

The Special Representative's primary responsibility is to coordinate and lead the 2010 Initiative. This is achieved by working with other nations and organizations to coordinate and accelerate international demining efforts.

The Special Representative also works to increase the public and private resources dedicated to identifying and clearing mines, promote public awareness about mines, and improve the means of detecting and removing mines.

The current special representative, Ambassador Steinberg.

GHD Mission Statement

The Office of the Special Representative for GHD seeks to create conditions that will eliminate the threat of landmines to civilians around the world by the year 2010. The office supports efforts in the U.S. and abroad to accelerate landmine detection and clearance programs, promote landmine awareness in affected nations, assist survivors of landmine accidents, enhance research and development of new demining technologies, and develop public-private partnerships to support these programs (From the Office of the Special Representative of the President and Secretary of State for Global Humanitarian Demining).

GHD Objectives

The objectives of GHD are achieved through the combined efforts of U.S. government agencies, foreign governments, nongovernmental agencies, private corporations, international agencies and the United Nations. The ultimate goals are to empower mine-affected countries to assume their own leadership over mine action programs and to speed the pace of demining.

The goals of GHD depend upon partnerships with the private sector and the availability of adequate resources from appropriated U.S. funds. While, contributions have already been made to mine action by corporations, NGOs, philanthropic foundations, civic foundations, educational institutions and other private groups, public-private partnerships are needed both presently and for the future to speed the demining efforts.

Ambassador Steinberg's Recent Address

On Nov. 28, 2000, the current special representative, Ambassador Steinberg, addressed the U.N. General Assembly with an update on the progress in the fight against landmines. Ambassador Steinberg reassured the audience that the United States is pleased to support the effort to reduce the danger of over 70,000 landmines that threaten individuals and the peace, democracy, and national reconciliation of one-third of the world's nations. He outlined GHD's progress since 1997. Since then, the United States has destroyed 3.3 million landmines. In 1997, the country unilaterally banned the export and transfer of APLs, and by 2003 it will end the use of all APLs outside Korea. Ambassador Steinberg also stated that the United States is seeking alternatives to landmines. The United States has committed to joining the Ottawa Treaty by 2006 if effective alternatives can be found and deployed by that time.

He stated that the United States is currently working with more than 36 nations in mine clearance, mine awareness education and mine clearance training. Although the programs take place worldwide, the largest programs are in Afghanistan, Angola, Bosnia, Cambodia, Central America, Laos, Mozambique, and Rwanda. The United States is using the best scientific talent available to identify new demining and clearance techniques. GHD continues to advise and support mine action centers such as the Geneva International Center for Humanitarian Demining (GICHD) and James Madison University's Mine Action Information Center.

In his speech, Ambassador Steinberg also outlined some of the exciting efforts of GHD to help establish public-private partnerships to support the Demining 2010 Initiative. The United Nations Association of the USA's (UNA-USA) Adopt-A-Minefield program generates private contributions to demine the 100 worst mine fields in Afghanistan, Bosnia, Cambodia, Croatia and Mozambique, in coordination with Ted Turner's U.N. Foundation. The U.N. Foundation is also supporting the Survey Action Center to produce mine surveys of a dozen countries. DC Comics created more than 1 million mine awareness comic books for children in Bosnia, Central America and Kosovo. An especially exciting operation is the joint effort of the Marshall Legacy Institute and the Humpty Dumpty Institute to purchase, train, and deploy mine detecting dogs worldwide, including a dog team recently sent to Lebanon. Wheelchairs for the World is helping disabled people regain mobility throughout the world.

GHD Efforts in 2000

Besides spearheading efforts to promote private-public partnerships, Ambassador Steinberg worked to raise domestic awareness of the landmine issue. In December 2000, he addressed over 600 high school students from 27 schools at the 17th Prince William Model United Nations Conference at C.D. Hylton Senior High Schoolin Woodbridge, Va. In his speech titled "Humanitarian Demining: To Walk the Earth in Safety," Steinberg described U.S. and U.N. mine clearance efforts. The conference was designed for students to model actual foreign delegations to the United Nations in attempt to address world issues through diplomacy, debate, negotiation and parliamentary procedure.

An ongoing partnership arranged by the special representative between the U.S. Department of State and Roots of Peace, a California-based NGO, has evolved into a new mine awareness campaign. Passengers of public transportation in the San Francisco Bay Area are now seeing bright orange advertisements with the message "What if landmines were in the USA?" The signs are designed to provoke commuters to imagine the effects of landmines and provide information about how they can participate in making the Balkans mine-safe through Roots of Peace and the Slovenian International Trust Fund for Demining and Mine Victim Assistance.

The District of Columbia Students Against Landmines (DC SALaaM) Project was created in January 2000 as part of Ted Turner's U.N. Foundation outreach program to the District. This project incorporates the UNA-USA Adopt-A-Minefield Program. On Nov. 16, 2000, Ambassador Steinberg was the keynote speaker at Bell Multicultural High School to helplaunch DC SALaaM's campaign to raise funds to clear a mine field in Mozambique. The ambassador shared his experiences in Angola and Kosovo, where he saw firsthand the effects of landmines on civilians. Two Texas chapters of the UNA-USA also launched drives to clear select mine fields in Bosnia and Herzegovina as part of UNA-USA's Adopt-A-Minefield program. On Sept. 21, 2000, Ambassador Steinberg was a keynote speaker at the GHD conference held by the Austin Chapter of UNA-USA to promote public awareness for humanitarian demining, particularly to "adopt" a mine field in the village of Praca, Bosnia and Herzegovina. The Ambassador then proceeded to help the Houston Chapter launch its Adopt-A-Minefield drive to clear another mined area in Bosnia and Herzegovina. He also spoke at four schools while in Texas. The ambassador and GHD continue to plan events to promote public awareness of the landmine problem.

GHD Plans for 2001

Since former President Clinton's 1994 call to the United Nations to eliminate the threat of landmines, the U.S government has donated about $400 million to humanitarian mine action efforts worldwide. In his address to the U.N. General Assembly, Steinberg announced that the United States is committed to continue support through the provision of approximately $100 million in 2001.

As 2001 gets underway, GHD is working with Warner Brothers on a pilot project for public service announcements using animated Looney Tunes characters combined with real footage from mine affected countries. The purpose is to foster greater mine awareness among threatened populations, particularly children, and to demonstrate that mine victims continue to be valued citizens.

Following up on Ambassador Steinberg's public outreach in Texas last summer, GHD is now working with a consortium of leading citizens from Austin to galvanize that city's practical support for mine action overseas. Through these and other efforts the GHD strives to build public-private partnerships to support the Demining 2010 Initiative and to create a mine-safe world for all. ■

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Mine Action—
A Model for Other Global Challenges?

by Dennis Barlow, *Director, Mine Action Information Center*

A FEW SHORT YEARS AGO the humanitarian demining task seemed insurmountable. Not only was the prospect of eliminating landmines as a global threat deemed unachievable, but the political and organizational landscape was new, diverse and uncharted.

A Brave New, and Complicated, World

Humanitarian demining, if not a new phenomena, was new to a global community which had only just shed its Cold War cloak and was trying to cope with emerging regional threats to stability, independence movements, civil warfare, refugee surges, factional antagonisms and border challenges. The organizations involved in demining were as varied as the kinds of landmines and UXO, which dotted the landscapes of some 60 threatened countries. Newly formed, but highly motivated and effective NGOs such as Halo Trust, Norwegian People's Aid, and the Mines Actions Group (MAG) were soon joined by other NGOs, for-profit corporations, international organizations, military task forces, donor nations and concerned individuals.

The problem was that such diverse organizations, performing a plethora of what we now call mine action functions, were engaged all over the world in an uncoordinated and sometimes dysfunctional process. Everybody wanted to do well, but there was no coordinating mechanism to maximize, integrate, record, implement and evaluate overall plans and operations. Even worse, the modus operandi of these various organizations rarely brought them into contact with congruent organizations. Whatever cooperative global, regional, or concerted efforts were devised had to be engineered with little precedent and even less authority.

Dennis Barlow

The Success of the Humanitarian Demining Model

What has happened in the past five years has been just short of a political miracle. Out of the chaos of many individual organizations just trying to "do good" has emerged a community of humanitarian mine action activists and operators which has collectively, professionally, and quietly created what may be a model for other international efforts.

The newly assigned Director of the U.N. Mine Action Service (UNMAS), Martin Barber, observed this new state of affairs in his address to the Fourth International Meeting of Mine Action Directors in Geneva on Feb. 5, 2001. Having the perspective of one "returning to the vineyard," he remarked upon the extraordinary cooperation of many groups and the seamless nature of operations as a matter of course in mine action today.

I must admit to some shock at hearing that observation, and yet it took me only a few moments' reflection to realize that he was absolutely correct. Having been involved in this issue from 1994, I—like many others immersed in the challenges and everyday stickiness of demining issues—had failed to appreciate the great organizational, operational, management, and informational strides which have characterized this great cause in the recent past. It is worth the time to catalog some of the great, but perhaps unnoticed trends, which have emerged and become part of this process.

10 Innovative Approaches to Mine Action

Conferences and Workshops. The acceptance of a new challenge dictated that a series of conferences, seminars, and workshops, needed to be held to both frame the challenges of demining *and* to get to know the players. As a result of an aggressive schedule of such meetings, many partnerships, alliances, dialogs, concerns and plans for action have resulted. These gatherings have targeted various demining groups, functions and issues, and have become "real-time" clearinghouses for ideas and "next steps" and have often framed such hot demining topics as the use of mine detecting dogs, geographical systems requirements, donor concerns, standards, management questions, etc. It is this kind of forum, which has fostered the trust and camaraderie, that has become a hallmark of the mine action community.

U.N. Leadership. Several U.N. agencies, such as UNDP, UNOPS, UNHCR, UNICEF, UNDPKO and WHO, have an abiding interest in mine action. Over the past several years these organizations, working with the U.N. agency specifically charged with the comprehensive oversight of mine action—UNMAS—have coordinated their efforts and facilitated a structured and organized U.N. approach to meeting the entire scope of landmine-related challenges.

Advocacy Groups. While the "anti-personnel landmine ban" organizations are often recognized for their devotion to advocacy, they have also been very active in supporting humanitarian demining, mine awareness and victim assistance projects. Besides performing groundbreaking survey and database work, the International Campaign to Ban Landmines, through the publication of its monumental *Landmine Monitor Report,* has produced an invaluable resource relied upon by the entire mine action community.

R&D. One of the most frustrating aspects of mine clearance is the lack of what has been called the "silver bullet" solution to the problem. Perhaps a greater challenge is that the market and procurement path for technologies designed for humanitarian applications are murky. Despite the difficulties, however, many donor nations have developed creative approaches to the problem. As a result, new demining technologies are continually being developed. Of special note is the effort to unify much of the work being done around the world under the rubric of the International Test and Evaluation Program (ITEP). The ITEP approach promises to be an effective way to avoid R&D duplication and point the way to an impartial and effective evaluation process.

Coordination and Information Services. The new millennium is already characterized by a realization of the importance in the processing and management of reliable information. Whether geo-spatial, narrative, or quantitative, the identification and use of information is one of the keys to carrying out effective mine action programs. The creation of the Geneva International Center for Humanitarian Demining (GICHD) was Switzerland's contribution to this critical outreach effort. The GICHD has become a chief clearinghouse for studies, committee meetings, and developing methods for implementing U.N.-directed standards and electronic information processes. James Madison University was asked by the U.S. Department of Defense to supplement the GICHD outreach with conference, web page and journal activities. Perhaps the most effective real-time and informal communications network has been the always interesting and relevant chat room managed by Menschen Gegen Minen (MgM), an NGO.

Civil-Military Cooperation. The role of militaries in supporting mine action has for some time been controversial. Nevertheless, many nations—both those providing assistance and those afflicted with landmines—have re-configured and trained various elements within their militaries to accept this mission. A recent conference of militaries providing these services has revealed improved coordination efforts with NGOs, host-nations, recipients and other organizations. Military humanitarian assistance roles are not essentially in the mine clearing areas, but in providing technical advice and training, mine awareness support, victim assistance, research and development venues, and the procurement of equipment and supplies.

Surveys. In determining the kinds of mine action required, as well as to arrive at a meaningful prioritization and development plan, it is critical that an appropriate survey be conducted. However, there are many surveys and methodologies to measure. The humanitarian demining community has developed a number of excellent instruments to measure various relevant data on suspected landmine-contaminated areas and the resulting socioeconomic impact. These surveys have yielded invaluable data, which can suggest the proper scope of a campaign and greatly increase the efficiency of an operation. The impact surveys now being conducted by the Survey Action Center (under the control and guidance of the Vietnam Veterans of America Foundation and UNMAS, respectively) are producing just such data.

Public-Private Partnerships. A novel concept for maximizing public participation and support of humanitarian demining activities has been the identification of private or educational organizations to participate actively in the process. This approach has the benefit of allowing private donors to get more directly involved. It increases the number of people who gain a realistic and "up-close" perspective into the nature of the effort, while, at the same time, raising much-needed funds and increasing the range of activities countenanced within mine action. Both the Adopt-A-Minefield project and the Superman and Superwoman comic books are examples of U.S. efforts to invigorate the demining process through the active participation and support of private organizations.

National Input. The demining issue confronts many nations in many ways. Some nations are donor countries; within this group donations can consist of funds, human resources, training, equipment, or logistical support. Afflicted nations have varying needs: money, training, organizational and management skills, etc. The mix and match of requirements and resources and the interplay of the application of those resources is a very tricky game. Many of the nations involved use some of the processes noted above as ways to get involved. However, there are other mechanisms. Twenty-three donor countries have formed a sounding-board group called the Mine Action Support Group (MASG), which frequently reviews the state of play in the mine action arena and recommends policy guidance. Signatories to the Ottawa Treaty meet semi-annually under the auspices of UNMAS and the GICHD in Geneva to stay abreast of current trends and suggest various plans of action. The bottom line is that virtually no nation goes without the opportunity to gain access or input into the various groups within the demining community.

Academia. At an important demining conference held in Helsingor, Denmark, in 1996, it was noted that universities had much to contribute, but were silent in their application to the landmine issue. Today, many universities are key players in the mine action community: Cranfield University in England is conducting a highly successful mine action manager's course; JMU acts as a major mine landmine information hub; and the University of Western Australia has become a leader in the development of low-tech, but highly effective protective gear for deminers. A whole host of schools are now involved in clearance R&D, while others are offering courses directly related to landmine challenges.

It is interesting to note that these approaches to meeting the unique challenges posed by the landmine threat have been accomplished in a very quiet and unobtrusive way. Very little in the foregoing list smacks of authority or command. Instead, they point to a voluntary and flexible way of organizing various capabilities into a plan that uses each application for the good of the whole. In many instances, roles have been defined by trial and error, or by default. There is no claim here that each of these efforts is proceeding without friction or even efficiently.

Still, it is amazing that such a wonderful quilt could have been made out of so many different fabrics, with so many designs. One cannot help but wonder if the same kind of coordinating mechanisms are possible (desirable?) in other international endeavors. ■

[Note: The Director does not claim that the above processes comprise a complete list. He invites readers to add to this list of mine action processes to make a more comprehensive reporting of this "model" sometime in the near future.]